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HANDLING • CRUSHING • SCREENING • WASHING

They Chose a Kennedy Gearless Crusher

In deciding upon a crusher capable of meeting the production requirements in their new up-to-date plant at Sandusky, Ohio, the Lake Shore Stone Products Co. chose a Kennedy gearless.

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Kennedy-Van Saun Mfg. & Eng. Corp.

120 BROADWAY,
NEW YORK CITY

Write today for our crusher catalogue, showing how the greater simplicity, less power requirements and small number of wearing parts of Kennedy Gearless crusher guarantee maximum production at minimum cost.

October, 1922

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Owners of Brownhoist cranes and buckets are far-sighted buyers. They know that many years of service are built into all Brownhoist products.

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Manganese steel digging edges, annealed steel castings where there is any strain and big, bronze-bushed bearings insure long life.

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1 Yard	$500
1½ Yard	$623
2 Yard	$725

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BROWNHOIST

MATERIAL HANDLING MACHINERY

Pit and Quarry

Member Audit Bureau of Circulations
A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 7 CHICAGO, ILL., OCTOBER, 1922 NO. 1

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Real Power Steer

The Thew Power Steer is a real *power* steer. Many devices have been put on Continuous Tread trucks under this name but in every case it has been necessary to get down and hook up chains, levers, hose, etc. This is not necessary with the Thew.

Thew Power Shovels

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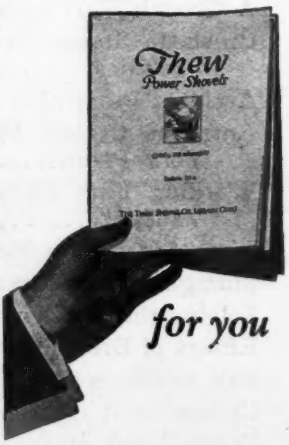


for you

The Thew continuous truck has two speeds. It is semi-flexible in construction. The heat treated cast steel treads are driven by double sprockets and are further supported by the double set of idler rollers. Since the treads do not project beyond the truck frame you can dig over either end.

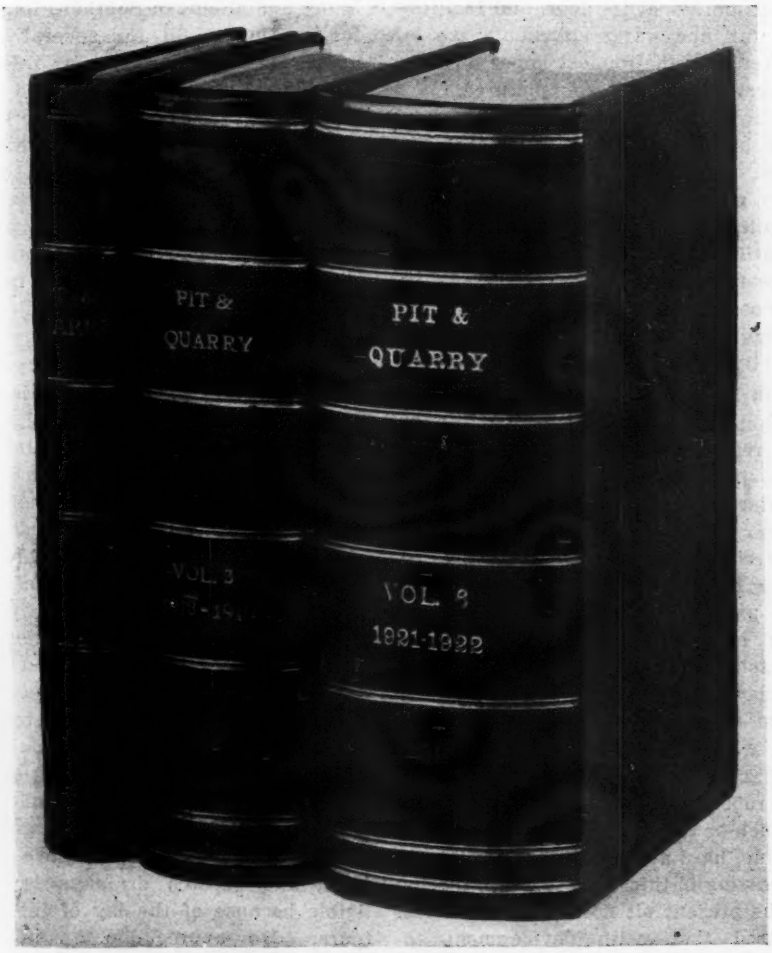
This is only part of the story. Write for Bulletin 111-X.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

Pit and Quarry

Vol. 7 Chicago, Ill., October, 1922 No. 1

A Growth That Speaks for Itself.



The cut shown above literally "speaks volumes." The sizes of the first, an intermediate, and the latest yearly volume illustrate how PIT AND QUARRY grew as a direct result of the faithful service it has rendered.

494156

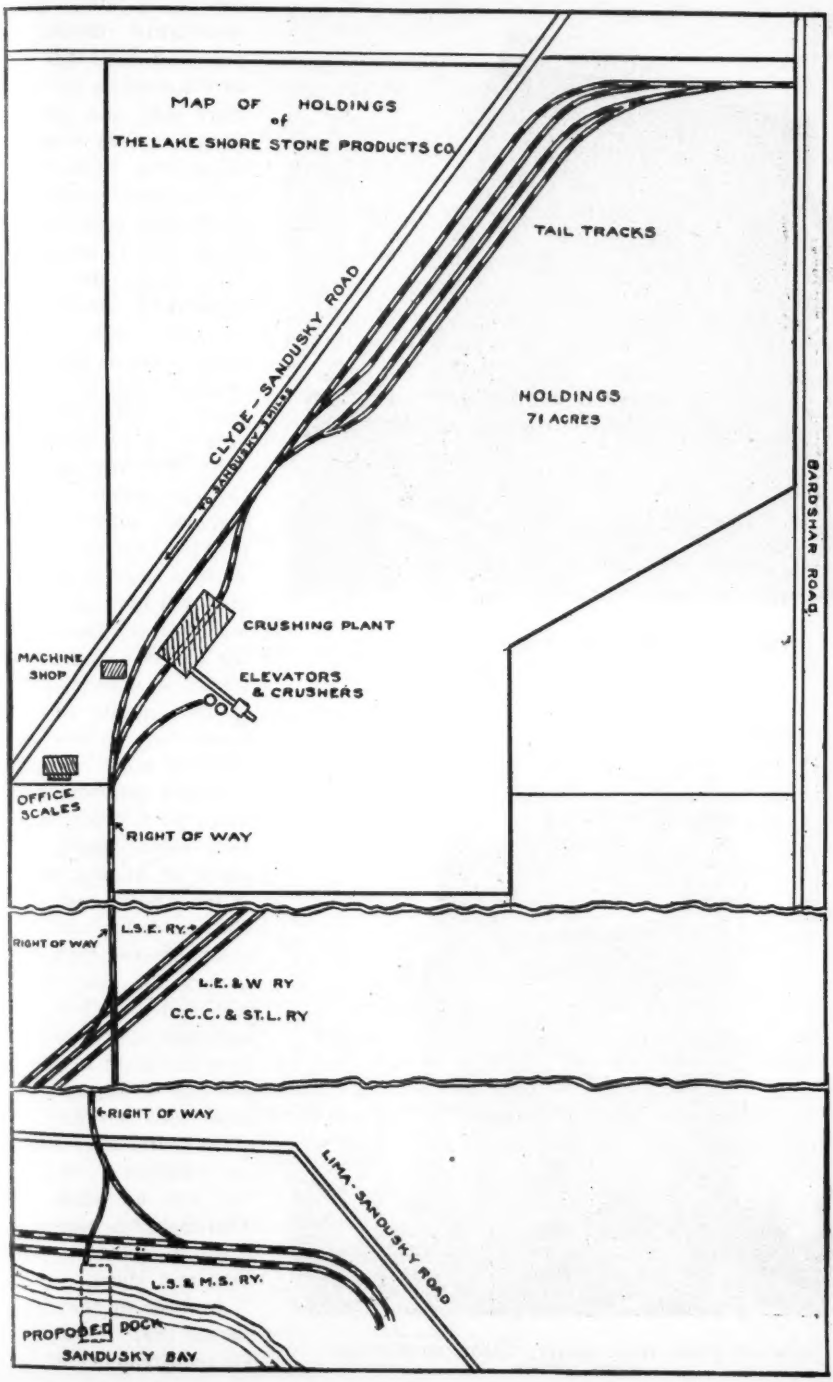
Crushed Stone Plant With Unequalled Railroad Facilities

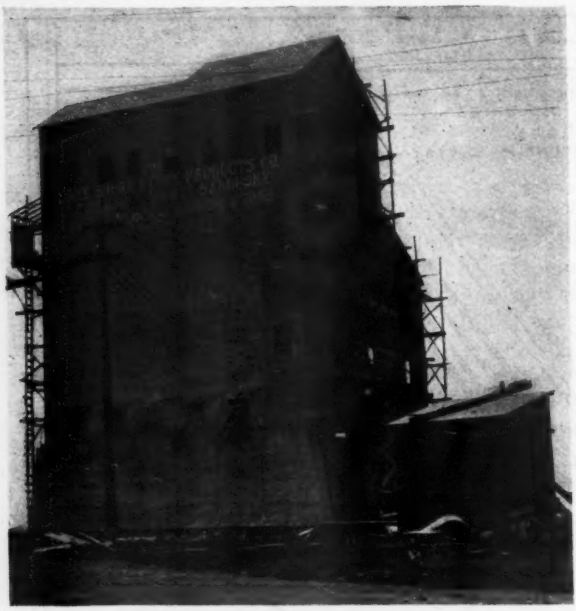
THE Lake Shore Stone Products Company, whose new quarry is located just outside Sandusky along the Clyde-Sandusky Road, appears to be well situated for the profitable production and distribution of crushed limestone. There is a fine local market at its door, and facilities for rail and water shipments are far better than the fondest hopes of many quarrymen have ever pictured.

The company owns 92 acres of land and has options on 127 acres more, over all of which blue limestone of very good quality occurs in favorable condition for profitable handling. Stratification to a depth of 200 feet does not exceed 26 inches in any instance. Most of the strata are from 1 inch to 3 inches in thickness, fitting exactly one on the other without earth parting at any point. All State geological reports which touch upon the region give a very high rating to the stone, which was known to the earlier geologists as a Corniferous or Upper Hedelberg formation, but is now classified as Columbus and Delaware limestone, the latter being the top part of the formation. The pit was originally opened for railroad ballast. It shows no vertical seams of clay, and only one horizontal clay seam about five feet down from the top, which averages only an inch or two in thickness. Above this seam the roof is thinly stratified in layers an inch or two thick. The stone below is blue, hard and compact, with layers increasing in thickness to 4 or 6 inches at the present pit floor. It thus seems assured that, with development to proper working depth, the stone would be excellent for shooting on account of the absence of very thick strata.

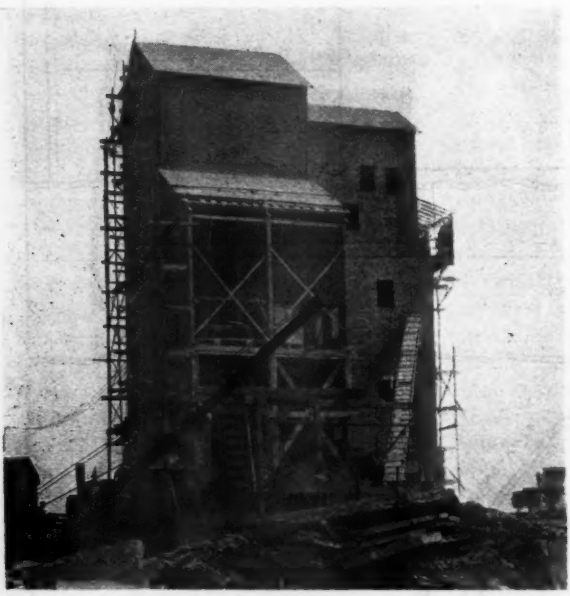
The property owned by the Lake Shore Stone Products Company was originally taken over about forty years ago by Chauncey M. Depew, the Vanderbilt family and their associates. It was operated for a number of years and the product used by the Lake Shore and Michigan Southern Railroad for making a fill for several miles across Sandusky Bay. In order to facilitate transportation at the time this ballast was taken out, the original owners built a standard gauge railroad of 2½ miles from the quarry to the shore of Lake Erie. This right-of-way, which became the property of the Lake Shore Stone Products Company when it acquired title to the quarry site, now crosses three other railroads. By means of this right-of-way and other connections the company possesses all the shipping facilities offered by the New York Central, Lake Erie & Western, Big Four, Baltimore & Ohio, Pennsylvania and Lake Shore Electric Railroads. In addition to this it has at its door the cheapest and most efficient of all local shipping facilities—Lake Erie. One of the future developments planned by the company is the building of a dock at the end of its right-of-way on Sandusky Bay. The right-of-way may also be used at some future time by the company as a belt line between all the roads it crosses. The operation of such a road should be very profitable.

The general elevation of the ground surface is about 50 feet above lake level, and surface drainage is negligible because of the lay of the contours. No appreciable amount of water was found at the 8-acre pit, although it had not been pumped out for years. The pitch of the strata should afford cheap pumping when the


MAP OF HOLDINGS
of
THE LAKE SHORE STONE PRODUCTS CO.
TAIL TRACKS
CLYDE - SANDUSKY ROAD
HOLDINGS
71 ACRES
GARDNAR ROAD
CRUSHING PLANT
MACHINE SHOP
ELEVATORS & CRUSHERS
OFFICE SCALES
RIGHT OF WAY
RIGHT OF WAY
L.S.E. RY.
L.E. & W RY
C.C.C. & ST.L. RY
RIGHT OF WAY
LIMA - SANDUSKY ROAD
L.S. & M.S. RY.
PROPOSED DOCK
SANDUSKY BAY



View of Plant from Clyde-Sandusky Road

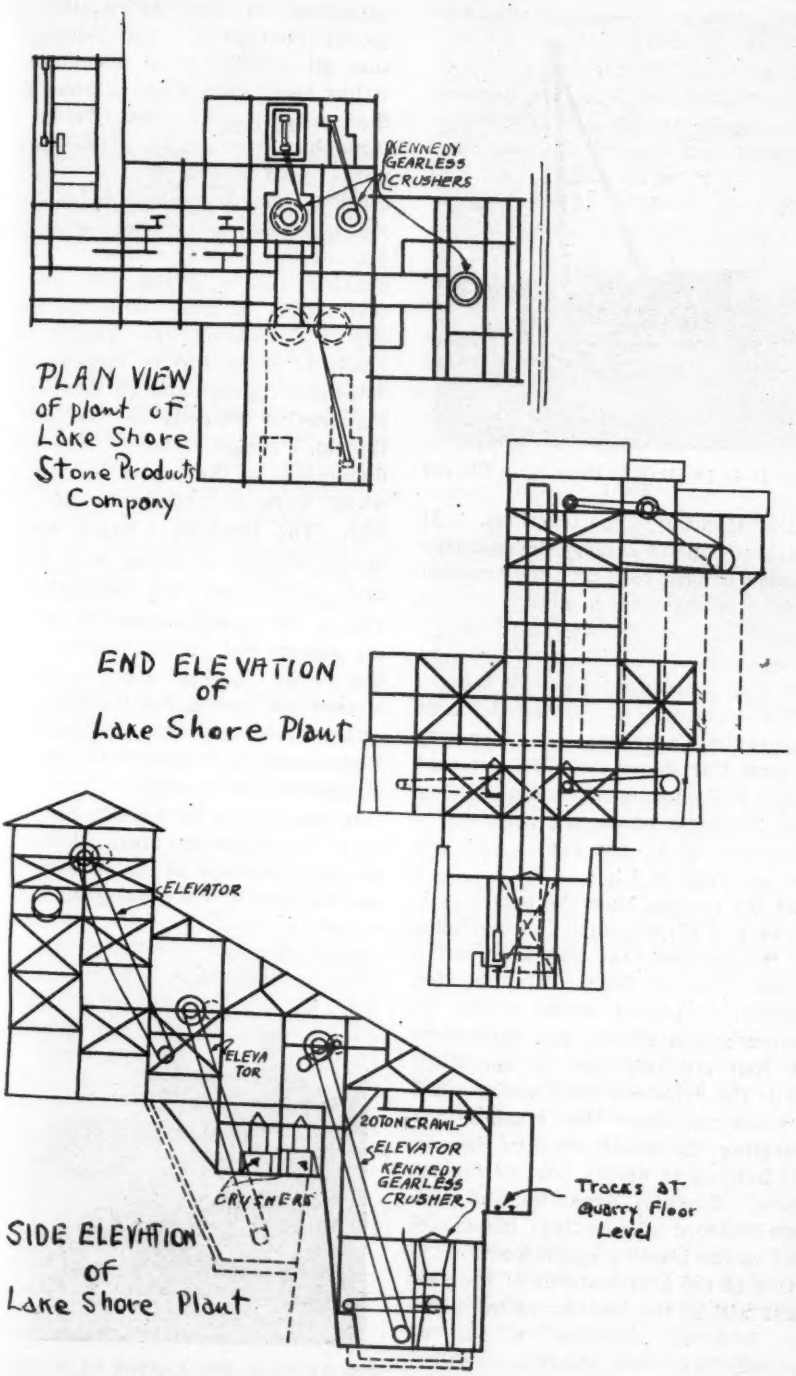


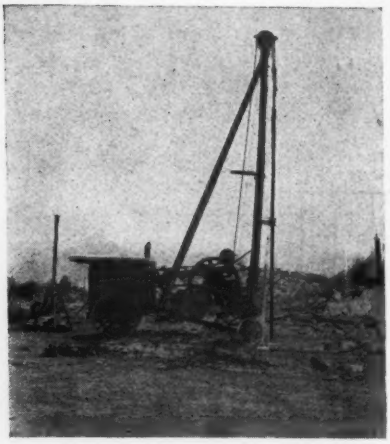
View of Plant from Quarry Side. Still Under Construction

quarry is sunk to a workable depth, as pumping facilities can be installed on the lakeward side, and the fall of the surface drainage along the right-of-way to the lake is ample.

The site requires but little earth stripping. The area has been scoured by the glaciers of past ages, which have scraped the rock surface nearly clean, leaving approximately only 6 to 10 inches of dirt. For the present, the 8 acres already stripped afford practically clean stone without any stripping, and will give an excellent working face when the pit is deepened, as the stone appears to be of fine quality and in layers of a size for blasting most cheapfly. The blue limestone runs down to a depth of 22 feet, below which is a seam of fluxing stone. When under way, it is the intention of the company to work the quarry for both kinds of stone. There is enough material to keep the plant in operation at a capacity of 2,500 tons per day for sixty years, after which an additional 50 foot lift will be taken up. The operators expect to find it a fast and drill and shoot.

Analysis of the stone shows that it exceeds all requirements of the


KENNEDY GEARLESS CRUSHERS
PLAN VIEW of plant of Lake Shore Stone Products Company
END ELEVATION of Lake Shore Plant
ELEVATOR
ELEVATOR
20 TON CRANE
ELEVATOR
KENNEDY GEARLESS CRUSHER
CRUSHERS
Tracks at Quarry Floor Level
SIDE ELEVATION of Lake Shore Plant



Blast Hole Drilling is Done by a Clipper Drill

State Highway specifications. It measures up to every demand for railroad ballast, road and construction work. Its chemical composition is as follows:

Silica ..... 4.6 per cent
Iron and Aluminum Oxides ..... 1.2 per cent
Magnesium Carbonate...15.3 per cent
Calcium Carbonate.....79.6 per cent

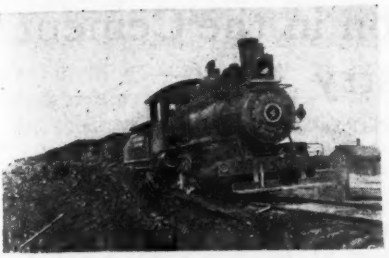
It has a French coefficient of 8.2 per cent, hardness of 19 per cent and a toughness of 11 per cent. The per cent of wear is 4.1.

At the present time the company is working a Clipper drill, boring holes for the charges that will work out a deeper quarry floor. The blasted material is picked up by a No. 36 Marion steam shovel and carried to the four crushers now in operation. While the extensive construction work is going on, these four crushers are providing the plant with an income and helping to defray part of the expense. Hercules dynamite and Cordeau-Bickford detonating fuses are used in the blasting operations.

One of the best features of the new plant will be the location of the primary breaking machine, a No. 30 Kennedy-Van Saun gearless crusher. This crusher will be located in a pit extending 34 feet below the new quarry floor level. The building of this pit is just about accomplished. It has been blasted out of solid rock, the excavated material being put through the crushing plant that is now being operated and sold as crushed stone, thus helping to defray a considerable part of the cost of hewing out the pit. The idea of this expensive feature of the new plant is that it will do away with the necessity of elevating the quarry cars. Loads of stone will be dropped from side-dumping cars and go through the big crusher, directly to the boot of the No. 1 bucket elevator. The inside dimensions of the top of the pit will, when work is completed, be 44x30 feet. The Kennedy crusher will, by means of this mounting in a pit, be given a solid bed rock foundation and will be in a very accessible position for repairs and replacements. Above the spider of the crusher will be located air hoists for handling very large stones that may bridge on the spider, and to take care of the work of tippling quarry cars.

In the quarry, stone will be loaded by a No. 36 Marion steam shovel and by equipment to be added later into 4½ cubic yard cars, designed by Mr.

Quarry Cars are Loaded by a Marion No. 36 Steam Shovel

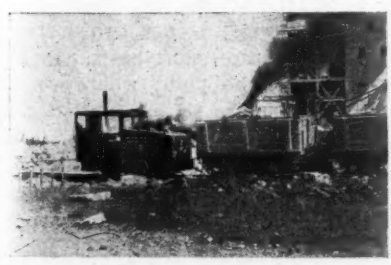


Company has its own standard gauge switch engine.

E. B. Nichols, superintendent of the plant. Mr. Nichols has been working for some time on the development of new ideas in quarry cars and expects to find the equipment now being made on the ground at the plant very satisfactory. These cars are hinged on the open side at three points. The method of tippling will be to attach a hook from an air or drum hoist to the L-angle-iron supporting the car bottom. The edges of all the quarry cars that Mr. Nichols is building are bound with old quarry rail which should add materially to their life.

Haulage in the quarry is being taken care of by an 18-ton Davenport locomotive, an 18-ton Porter locomotive and two Whitcomb 7-ton gasoline locomotives, all narrow gauge.

As soon as the cars are brought up to the plant they will be dumped as already described and the stone fed to the large Kennedy crusher. After passing through this machine they will drop to the boot of a No. 1 bucket elevator which is 73 feet between centers. This elevator will deposit its load on a shaking grizzly, manufactured by the Kennedy-Van Saun Engineering Corporation. Oversize dropped out at this point, will be passed on to a No. 49 Kennedy-Van Saun gearless crusher, and undersize to a No. 37 Kennedy gearless crusher. A No. 6 Austin crusher and a No. 4 Austin crusher will be used to effect further reductions in stone sizes. These crushers discharge into a concrete pit extending down 19 feet, at the bottom of which is the boot of a No. 2 bucket elevator, 62 feet between centers. This will in turn, pass the product on to a No. 3 elevator which is also 62 feet between centers, and



Part of the haulage is done by Whitcomb gasoline locomotives.

The No. 30 Kennedy gearless crusher is not yet assembled.

which terminates at a hopper above a large rotary screen. Republic belting is used for elevating material, and for transmission throughout the plant.

The screen over all is 38 feet by 8½ inches long, with a screening surface of 30 feet, and has a diameter of 84 inches. The stone will be dropped from this large screen to rock bins below, which are laid out to accommodate all the commercial sizes and a variety of mixes, which are made by spouting the products of various sections of the screen into the same bin. Car loading is done either from below the bins or at the side. The overhead loading is through clam shell bin gates supplied by Kennedy-Van Saun, and side loading through spouts designed by Mr. Nichols.

Except for the quarry equipment,

(Continued on page 89)

Accident Prevention in the Cement Industry

A Paper Given Before the National Safety Congress

By H. S. JACOBSEN

Manager, Bureau of Accident Prevention and Insurance, Portland Cement Association, Chicago

THE first time the cement industry heard of accident-prevention work was in 1911 at our semi-annual meeting in Kansas City. Mr. Nicholson, now president of the National Cement Company, brought the subject before the meeting, saying that inasmuch as a good many States were working on compensation laws it would be to the advantage of the industry to look into the matter and see if it would not be possible to prevent a good many accidents, thereby getting a reasonable amount of accident prevention and insurance work started within the Portland Cement Association. Mr. J. B. Lober, president of the Vulcanite Portland Cement Company, was the first chairman of the Accident Prevention and Insurance Committee, the position which Mr. Tagge now holds.

At the next meeting of the association papers were presented on accident prevention and insurance. For several years things went along very quietly. There were reports at the regular meetings of the association, but no real data to show whether progress was being made or not. It then was decided to get a real picture of conditions, that it would be necessary to gather reports of all accidents which happened at the various plants and study them in order to prepare statistics which would show the progress being made in the work.

The first study of accidents was for 1913 and it was weak in a good many places. For some reason we had an uphill fight all the time in getting accidents reported. We were told by men in charge that they had few accidents of any consequence—an accident at that time meant a man killed or an arm torn off—something of that kind; anything less than that did not count. I had a terrible time securing reports. I remember one company in particular: They sent in reports of only a few accidents, so I wrote asking if that was all the accidents they had had during the year. They answered "Yes, that was all they had." I wrote again and again and finally I got their report. It showed they had lost about 800 days' time. Undoubtedly there were a lot of such cases and it took several years to get all of our companies to report their accidents.

The first studies of accident figures were compared on a basis of production—so many million barrels produced and so many accidents. That system was misleading, inasmuch as one plant is more efficient than another, not only from a labor standpoint but as to equipment, and one plant might produce a million barrels with considerably less labor than another plant; for that reason the comparative method struck us as being unfair. Then we commenced to compare statistics on the basis of men working at a plant, but that was found to be unsatisfactory, too, inasmuch as some men worked on a two-shift and others on a three-shift basis. Finally we reached the point where we decided to compare all our statistics on the basis of actual man-hours, for it does not make a great difference whether a man works eight, ten or twelve hours. That is the basis we are using now. It is rather difficult to go back as far as 1913 to see just

what progress we have made, because we have not some basis of comparison for all of those years—we have the figures only for 1918.

In looking over those studies for the last four years we find that we have a very healthy condition. We are not prepared to say that we have decreased our accident 75 or 90 per cent or anything like that, but I grant you a normal decrease. I would rather see it that way than something abnormal, which we could not keep up; we are working right along and in years to come we are sure to show improvement.

The past is gone and we cannot do anything about it, but we can do a lot for the present and the future. I visit different plants and get an insight into a lot of things that are lost to a good many people, even those in the industries. I have visited all our plants from coast to coast, from North to South, and know practically all the people—the superintendents and a good many of the foremen, the executives and so forth—and there is no secret as far as I am concerned about the work. I can put my finger on practically any plant and say how many accidents, within a reasonable degree, they will have next year, as it will vary only a few points one way or the other.

I was formerly an insurance man and in that business they talk about the "physical" and "moral" hazard. What is a "moral" hazard? It is not morality, such as the ordinary person thinks of. By "moral" hazard we understand the human element in connection with the risk; the human element is not only the employee, but also the employer, and possibly more the employer than the employee. There is no one in the cement industry who is not anxious to see accidents reduced, but possibly with some it is a passive rather than an active interest.

It is wonderful to see what a plant can do if there is the co-operation of everyone from the top to the bottom. I have seen plants that an insurance man would not shake a stick at because he would be afraid of them. I have seen plants, perfectly guarded from top to bottom for years, still having accidents, not on account of any mechanical condition, but because of the human element which enters into everything at that particular plant; not only in faulty work but in operation, family questions, community questions, etc.

We have found the same thing in all our no-accident months—I don't know of a single one that has not come up to the scratch. Last year, when we started these campaigns, we were a little in doubt about how to go about it. We decided that advertising, taking the proposition to the men, was the thing, and not to lay too much stress on mechanical questions. We have varied our methods at different plants, but we have got wonderful results, some almost unbelievable. If this can be done for one month, why not for twelve months and why not forever? There is only one reason I know of and that is that after a time enthusiasm commences to lag a little, everybody commences to slip, and accidents show up unless one is always on the job with new ideas and new plans.

I believe that next year's study of accidents, which will be for 1922, will show a very material improvement over 1921, which was an improvement on 1920. This was only possible because we are now able to get the active interest of executives and superintendents and other men who are leaders in industry.

We have held our district safety meetings in St. Louis, Allentown and Albany and are drawing quite a few cement people to those meetings; it is very encouraging to see our people

warm up to the proposition. I look forward to seeing our figures for the future better than they are now; even if they are getting better they are not so very good—we have nothing to be particularly proud of. The fact that last year we had fifty men killed in a working force of about 30,000 is nothing to brag about. The Ford plant, with 40,000 people, did not have a single fatal accident in a year and the International Harvester Company, with 30,000 people, had only one man killed in twelve months—this shows us that we have far to go!

Our fatal accidents are largely due to the peculiar nature of our industry and it is hard to say just what we can do to prevent them. During the last three or four months we have had a string of most peculiar fatal accidents—men being electrocuted on 110-volt lines removing light bulbs, and things like that. You cannot prevent such accidents by means of guards. Only through a continuous campaign of education, I suppose, will we come to a point where we can get all of our men to think in terms of safety, so they will see danger in practically everything, and stop and think before they act.

So far as I am personally concerned, I am not bothered about the problem of safety, because I really do not see much of a problem in it. A man is just as safe as he wants to be, and no more, and a plant is just as safe as it wants to be; it entirely depends on the standard they set for themselves. If we were satisfied, as we were years ago, with a record of having a couple of men killed every year, you can be assured that you are going to have just that many men killed, on an average, every year. On the other hand, if you say to yourself that you are going to cut out the accidents, you are going to do it some time; it may take time, but you are going to do it.

One thing has impressed me quite forcibly lately, a lack of discipline in connection with safety—possibly it has more to do with our condition than we think, this lack of discipline. If a rule is issued not to do this, that or the other thing, and if that rule is violated, something must be done about it. A rule that is not enforced is a bad thing.

During a no-accident campaign at one of our plants they had only one accident; one of the foremen stepped on a nail and did not report it. He lost thirty days through blood poisoning. If one of the foremen does a thing like that what can you expect of the men? Because a man has been with us a good many years sometimes it is difficult to penalize him, but there ought to be a way by which the men can be impressed with the fact if it is a rule to report all accidents as soon as they happen that that rule must be lived up to.

Housekeeping and plant conditions have much to do with accident prevention. It is a pleasure to go to some of the plants and see the flowers and the grass and everything kept in good shape. That impresses the men favorably and removes a lot of hazard; it is efficient in itself because the men go about their work in the way they should.

We have all had our troubles with safety committees and in discussing the problem today it seems as if we are still in doubt as to what such a committee should be and the work it should do. I have attended a good many safety committee meetings at cement plants all over the country; some of them have been excellent, but others have not been so good. In so far as the committee is concerned I believe we have used a wrong term when we call it a safety committee. The committee should always be composed of men who know more about that particular problem than anyone

else—that is why the committee is formed, to gather information to be later distributed to the rest of the people in the organization. The idea of the safety committee of years ago was for a group of men to endeavor to find all the dangerous places in the plant and to suggest remedies.

If the recommendations offered by the men were not carried out the work lagged and died. As far as guarding is concerned, I do not believe it is necessary to ask a committee to tell you what to do about your plant in a mechanical way. It is the superintendent's and the foreman's duty to have the plant in such shape that no workman can find a reasonable fault with it. In a few cases workmen will be able to suggest new guards, even in a well regulated plant, but not often. I would rather have the committees referred to as safety schools or something to that effect, and instead of asking the men to tell you what to do I would rather have you tell them what they should do. Educate them and tell them how accidents happen, not only at your plant but at other plants. For instance, in the last year and a half we have had eleven electrocutions. What do you think of that, eleven electrocutions? They were not all due to carelessness; ignorance played a part for the reason that a good many people have not the slightest idea of what electricity really is. They know that when they push in a switch the motor starts to run, but that is as far as they go. To such a thing as an ordinary light bulb they do not give the slightest attention; that is not only true of workmen but holds good generally. Anything less than 440 volts is not considered hazardous but every year people are killed with 110 volts in bathtubs, laundries, and in other places where there is a good ground—it is just as bad as if they were struck by 3,000 volts.

We make a mistake in not keeping our employees posted on what is going on. Ask one of them, a foreman if you like, how many accidents occurred in the plant last year and how many days' time was lost. I will guarantee that you will receive few correct replies. You cannot expect much interest unless you give them all the data available—the more you put on the bulletin board the better. Keep your men posted on what occurs in their own plant, that always interests them more than the doing somewhere else. Tell them how many accidents they had last year, how many each month this year. They should have this information and it is surprising how little of it is broadcasted among the employees.

Information of this nature leads to educational work in which we are all deeply interested. It also serves to develop latent talent in the plant and to bring forward the men we are anxious to interest in safety work. In one of our plants we have an expert showcard and bulletin writer. His bulletins are splendid and he has also built up a safety museum out of old tools and odd things he has picked up about the plant.

In so far as our work in the future is concerned and the results we can expect, this will depend entirely on the work that we do and the enthusiasm that we show at this time. We are going to get out of this activity just what we put into it. We must give the work our constant attention, because new employees come into our plants practically every day; in the course of a year some companies have a labor turnover of about 100 per cent or even more. That does not mean a change of the whole personnel, the turnover may take place in possibly only 25 per cent of the force, but those men are liable to get hurt, and it is up to the men in the plant to tell the newcomers what is expected of them.

American Cement Plaster Co. Operates Modern New York Plant

Manufactures Line of Finished Products From Gypsum Rock of the Akron "Basin"

ONE of the largest operations in the gypsum fields of Western New York, is that of the American Cement Plaster Company, which operates other plants at Gypsum, Ohio; Grand Rapids, Michigan; Fort Dodge, Iowa; Blue Rapids, Kansas; and Agatite, Texas.

The Akron gypsum "basin," as it is locally termed, is situated northeast of the village of Akron, some twenty miles east of Buffalo. The productive area lies south of the Lake Shore Railroad, to which connections are made by long switches. The basin is some two miles long with a maximum width of one mile. The deposit is pear shaped and it is at the small end that the American Cement Plaster Company's shaft is sunk. The bed of gypsum, as mined, consists of a 4 to 5 foot bed of light colored crystalline or granular gypsum, overlaid by 25 to 50 feet of thinly bedded impure limestones. These, in turn, are rather heavily covered by a mantle of glacial clay ranging from a few feet up to 25 feet in thickness.

The company's mine and shaft are situated one mile northeast of Akron on the Bloomingdale road, with the mine shaft southeast of the mill, and connected with it by an extension of the narrow gauge railroad up which loaded cars from the workings are pulled by hoist. The mine is entered by a two-compartment shaft, 86 feet in depth. A main gangway extends back about ¾ miles in a straight line. Up this main gangway are radiating gangways which are laid out so as to get the most from the fan-shaped deposit that is being worked. Pillars about 10 feet thick are left every 30 feet apart.

The gypsum bed as mined, ranges from 2½ to 5 feet in thickness, with a thickness in most places of about 3½ feet. The mine is quite a wet one at times, although the flow of water has been greatly reduced since the time the workings were first opened, when 4,000 gallons of water a minute were pumped from the shaft. No forced ventilation is employed, a small airway at the east side of the shaft giving sufficient air.

Drilling is done by 16 Scranton rock drills. The shots are made each night in holes made by drill runners during the day, while the product of the former night's blast is being loaded. When unusually large stones, too big for sledging, are encountered, they are broken by air hammers operating from compressors mounted on the running gear of mine cars, deriving their power from extensions of the trolley line used for haulage in the main gangway.

Material is loaded by hand on steel cars of 2 tons capacity each, which are drawn by one of the company's two Mancha Mules to the main gangway where trains are made up by the trolley locomotive that brings the cars to the foot of an inclined gravity track leading into the mine. Cars are hauled up this track by cable for a distance of 120 feet. This cable haul is handled by a special 2-drum hoist, belted to a Western Electric, 25 H.P., 2-phase motor. This hoist is located at the bottom of the crusher house, one drum on either side of the bucket

elevator which takes the material from the crusher.

Provisions made for handling mine cars at the tipple are rather better than one usually sees around a crushing plant. At the tipple end of each of the tracks of the mine, is located a small automatic weighing hopper with a capacity of, say, 5 tons. A gate at the side of each of these small hoppers lets the stone drop to a No. 8 Telsmith crusher, around which is built a large steel apron.

After the stone has passed through the crusher it goes to the boot of a chain bucket elevator, running directly under the crusher, and is elevated to the ground level, a distance of some 25 feet.

The crushed stone, after its discharge at ground level by the first conveyor, is picked up by a second chain bucket elevator and raised to the top of two steel storage bins, shown in one of the accompanying illustrations. These storage bins serve the purpose of keeping the mine and mill balanced, by preventing increased or diminished activity at either of the two points, from immediately or at all, reflecting itself in the other. This same purpose is accomplished by a large open stock pile located to the side of the steel bins, and served by a belt conveyor running overhead on a trestle, and equipped with a tripping device for setting down the material at any point along the length of the stock pile that is required. A view of this tripping device is shown in one of the photographs. It consists essentially of an arrangement of pulleys and a V-shaped scraper whereby the belt is made to discharge its contents at either side of the belt into spouts at either side of the belt. Flow to the spouts is determined by the position of a flop-valve. The flow of material to the belt conveyor running the length of the trestle, and the flow into the two storage bins is also determined by a system of flop-valves. The trestle belt conveyor is driven by a motor at the tail end of the conveyor. Some 10 feet away from the storage bins is located an idler, for securing proper tension on the conveyor belt. The tripping device described above, rests on car wheels which run along a track the length of the trestle, and may be set at any particular point. The foundations of the steel bins and stock piles are concrete, as is also the structure below, through which runs the tunnel belt conveyor that takes material from the stock piles or bins to the dryer.

This tunnel belt conveyor draws off material in the stock pile and bins through gates located every few feet apart, and through which the stone drops from the stock pile or bins. No provision appears to have been made to cause the flow of crushed stone in the stock pile towards these gates after the material has assumed its natural angle of repose.

The mill end of this tunnel belt conveyor is elevated sufficiently to bring the stone to the charging end of a Ruggles-Coles rotary dryer. This dryer is powered by a General Electric motor, and a Buffalo Forge Company blower is used to draw the hot gases through the dryer, and remove the natural moisture from the mines and the moisture acquired at the stock piles. After the stone has progressed through the dryer, it drops out at the bottom of a vertical elevator, which raises the material to a pan conveyor running across the railroad track, to the grinding building.

The stone coming over to the grinding building in the pan conveyor is dropped by chute to a Jeffrey hammer mill, from where, after reduction, it drops again by chute to a vertical elevator. This elevator discharges at large steel bins from which are fed

by gravity two Raymond mills and six French burrstones. The burrstones are used as auxiliary equipment to supplement the Raymond mills, or to substitute for them in case of breakdowns.

The product of the Raymond mills is passed by blower to the kettle bins above the four kettles, used for calcination. The product of these kettles drops to a screw conveyor which also feeds through an elevator to the four kettle bins. The product of the kettles is picked up by a screw conveyor running along a trough paralleling the kettles, and which is fed by spouts running down from the kettles. This screw conveyor discharges at a vertical elevator which passes through chutes to screw conveyors running into bins above three Broughton mixers.

At the top of the vertical elevator feeding the screw conveyors to the mixer bins, is a screw conveyor which passes its product to a hopper above a large trestle running across to the board plant. Thus a continuous kettle stream is being sent forward for board making purposes. The conveyor to the board plant illustrated in a number of the photographs is of the disc and cable type.

In the upper sections of the Broughton mixers, gypsum is weighted out in large cones suspended by chains on the beam of the scale. To the gypsum thus measured out accurately into batches is added the amount of retarder required for the particular set demanded by the lot going through at the time. At this point also, the wood fibre or hair is added. The company manufactures its own supply of wood fibre, obtaining the wood, mostly poplar wood and basswood, from the neighboring farmers and shredding it to the right size with their own machines. The hair used is washed goats hair, purchased in bales.

Provision is made for drawing off plain stucco unmixed with hair or fibre or retarder, and also for drawing off land plaster which may be sent direct to the cars as it comes from the mines in the raw state.

At the bottom of one of a battery of Bates valve bag packers is a slat conveyor on which the packers, after filling the bags, immediately throw the complete packages. This slat conveyor passes the bags to a point where they are easily taken off and piled 7 or 8 high on hand trucks for easy loading into box cars.

The company's board plant is designed along strictly modern lines, and the methods used for combining the plaster and rolls of paper are quite impressive. After the continuous sheets of wall board come to a point where they are cut to size, the cut boards are passed mechanically to two men who transfer them by a cradle to piles beside drying racks which run on overhead tracks into a dryer. After the plaster in the boards is fully dried, the boards are taken out and passed to a storage warehouse, from which they are loaded into box cars.

In connection with the American Cement Plaster Company's plant at Akron, is also a block plant, operated by the Structural Gypsum Company. Here gypsum purchased from the American Cement Plaster Co. is made into building blocks by modern moulding machinery. A number of the photographs showing large quantities of these blocks drying in the drying yard will give an idea of the activity of this concern.

Between these two enterprises a considerable amount of material is turned into finished products right on the ground. This manufactured material is all ready for application in various ways without further processing and the danger of improper later handling is thus minimized.

View of the Grinding and Calcining Plant from the North

The plaster plant has a capacity of 750 tons of plaster for each 24 hours operation. This amount includes many different mixes, all of which are carefully analyzed and checked up in the company's complete laboratory located in a building close by the mine. In this laboratory are performed all the mechanical tests necessary to insure the production of the highest grade materials, which will give perfect satisfaction when it arrives on the job. The varying and uncertain conditions which surround the ultimate use of the material make it easy to understand why the company is so particular about this part of its work. The chemical analyses are made at Buffalo and other points.

Rotary Dryer Building Connected with Bins by Tunnel Belt Conveyor

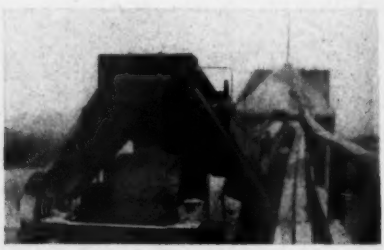
The plant is operated entirely by electricity. Power from Niagara Falls is taken in at high voltage and transformed down to 440 volts. A certain amount is converted into direct cur-

Quarters for Employes are Located Close to the Mill and Mine

One of the Steel Bins for Special Finished Products

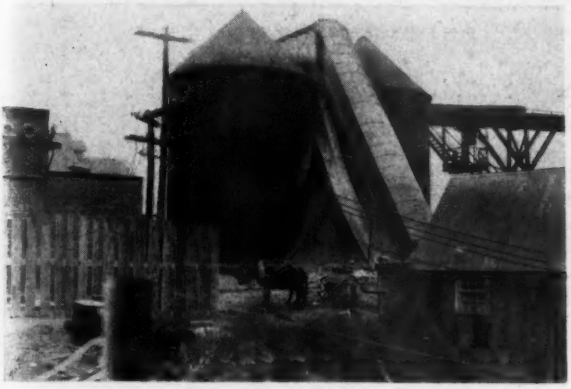
rent for use on the trolley system in the mines, and for the Scranton rock drills.

In connection with its plant at Akron, the company maintains quarters for a considerable number of its employees. These quarters, as shown by one of the photographs, form in themselves a sizable little community, and, besides furnishing good housing for employees and their families, keep the workmen closer to the plant



Tripper on Belt Conveyor to Stock Pile

View of Board Plant of Block Plant of Structural Gypsum Company



Crushed Rock is Carried by Bucket Elevator to Storage Bins and Stock Pile

After the stone has passed through the crusher it goes to the boot of a chain bucket elevator, running directly under the crusher, and is elevated to the ground level, a distance of some 25 feet. It is then picked up by a second elevator and raised to the top of two steel storage bins.

Mine Entrance and Trackway to Crusher House

Cars are hauled up this track by cable for a distance of 120 feet. This cable haul is handled by a special two drum hoist, which is located at the bottom of the crusher house, one drum on either side of the bucket elevator which takes the material from the crusher.

Stock Pile and Storage Bins Keep Mine and Mill Operations Balanced

These storage bins serve the purpose of keeping the mine and mill balanced by presenting increased or diminished activity at either of the two points from immediately or at all reflecting itself in the other. This same purpose is accomplished by a large open stock pile located to the side.

PLYMOU

Gasoline Locom

21 PLYMOUTH LOCOMOTIVES

are now used by the Morris County Crushed Stone Co. and its Associated Companies operated by F. W. Schmidt, Morristown, N. J. Ask for Bulletins.

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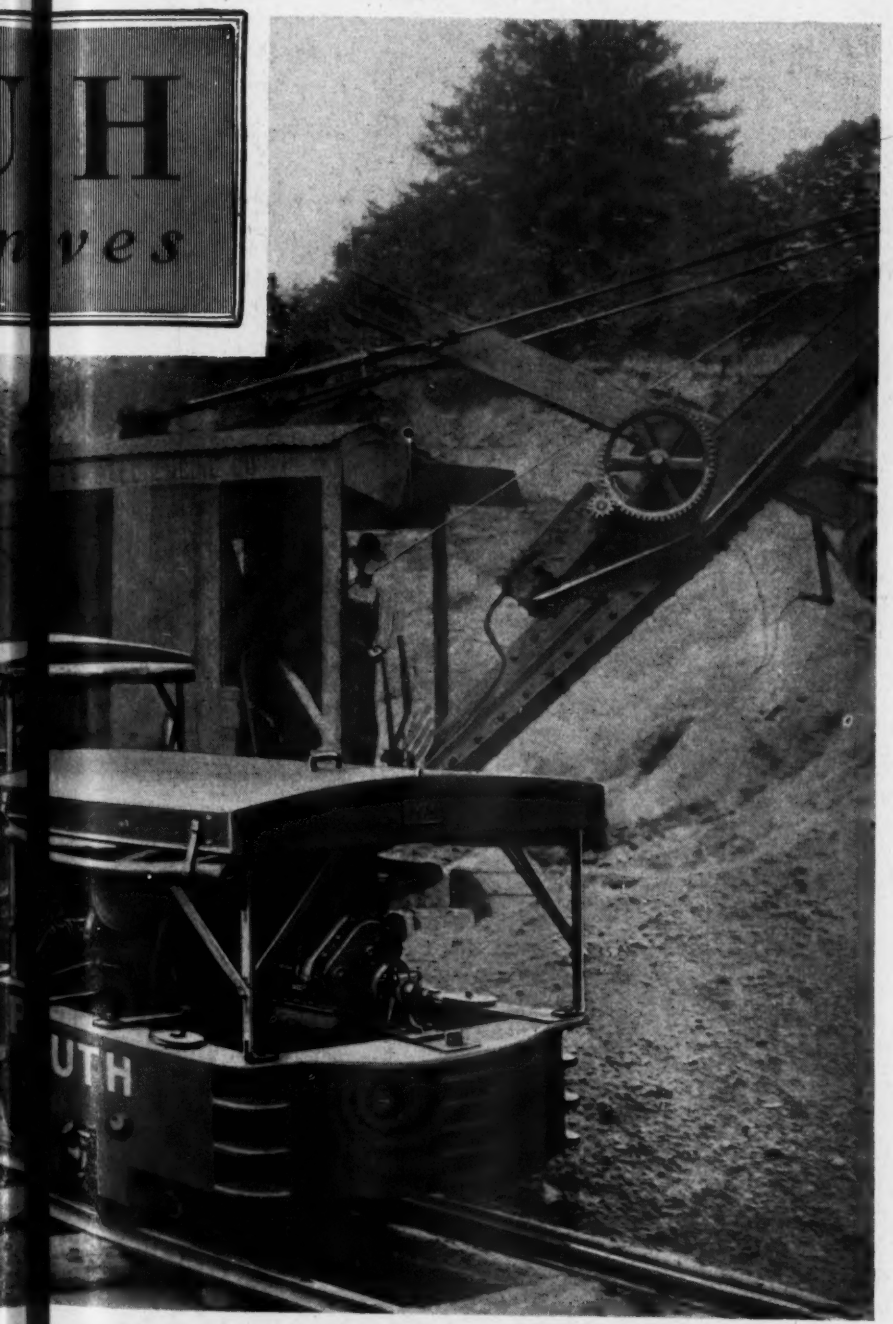
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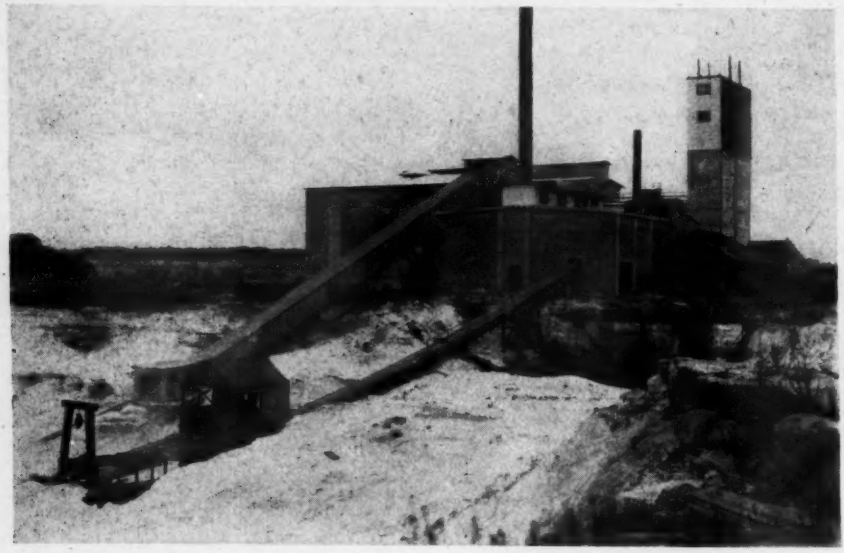


General View of Plant of Crescent Silica Company at Ottawa, Ill.

Working Fine Silica Sand Deposit in Illinois River Valley

A COMPARATIVELY recent addition to the group of silica sand plants in the Ottawa district in Illinois is the plant of the Crescent Silica Co., located some five miles out of the town. This company controls a deposit of about 150 acres, over most of which lies some very fine material. The high silica content of the sand on the property makes it very desirable for glass making, and its sharpness and other desirable qualities causes it to find easy sale for sand blast purposes.

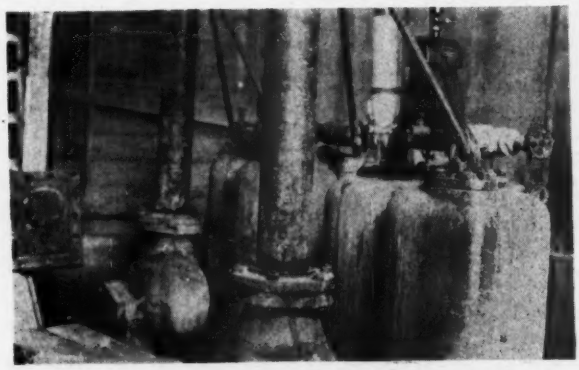
Throughout the property the harder and less desirable material is found in high strata, and the better and looser sand is further down. Very little waste material is encountered and the amount of spalls, niggerheads, and other culled matter is quite small. All parts of the property show an amount of iron and aluminum associated with the silica.

The material is obtained by open face methods. The silica occurs under a very light overburden, and, as already stated, improves in quality as continuous excavation deepens the workings. One part of the pit, that point at which sand of the best quality is pumped out, is quite a way below the level of the Illinois River, and seepage from the river about ½ mile away keeps entering the pit and necessitates the continuous operation of drainage pumps. A year or so ago the company was using the single pump for draining the pit of water, and had a very disagreeable experience when this equipment gave out. The workings were flooded and it took weeks of work to get the water down to a point where it was possible to start operations again. Pumps are now operated in duplicate and it is quite unlikely that a flood will occur again. A Worthington and a Gordon

steam pump are employed for this purpose, either one sufficient to do the work and both available for use if any unusual conditions arise.

Two kinds of material are produced from this pit, a pit run silica sand and a washed and dried product. The pit run sand is secured by a drag scraper, and the sand intended for washing and drying by steam pumps at the lowest point in the pit, as illustrated in one of the photographs. An occasional blast brings down sufficient loose material from a 75 foot face for removal by either process. Drilling is horizontal. A comparatively light blast brings down large quantities of material, for the sand is not very tightly cemented. The discharge of the drainage pumps is used to wash down the sand loosened by blasting.

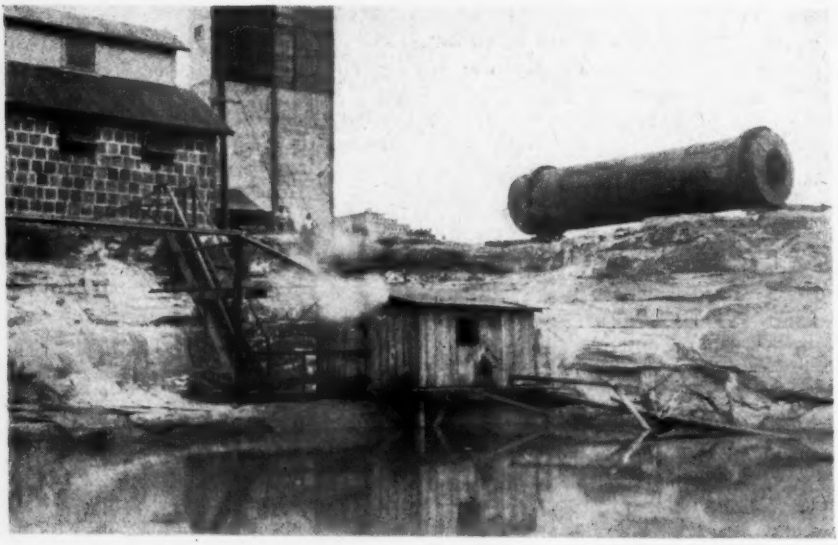
Moving Cars are Loaded from the Drain Bins Through Wide Spouts



Sand is Removed from the Washers by 2 No. 5 Nye Steam Pumps

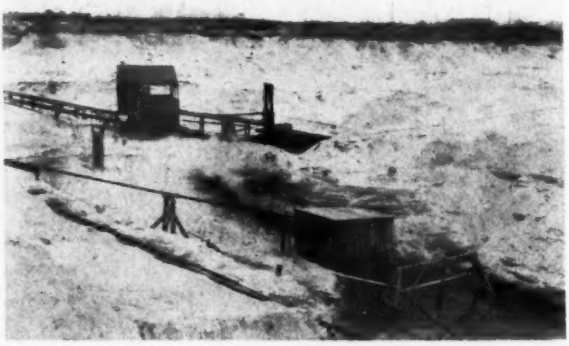
Boilers are Equipped with "Kicker" Doors

Finer Silica is Excavated by Steam Pumps



Reservoir for Water for Boilers and for the Sand Pumping Operation

The securing of the pit run material is quite a simple operation. A Le Claire scraper, operated by a two drum hoist, brings the material up to the bottom of a long belt conveyor running directly above cars, into which the material is dropped without going through bins. At the time that the company's new plant, here illustrated and described, was built it was necessary to permit this conveyor belting and the gallery in which it runs, to pass through one of the buildings and one to the track. This was necessary to avoid disturbing an existing arrangement that was satisfactory at that time. Later developments planned by the company include a change in this method of excavating pit run material. When the change is made the conveyor belt running through the building will be removed and the opening through which it enters the building sealed up.



Crude Sand is Excavated by Scraper, Finer Material by Steam Pumps

The securing of sand for the washing and drying operations is rather a

more complicated operation. The material is taken up first by two Nye pumps which discharge against a 30 foot head at the boot of a cleat elevator about 75 feet long between centers and running to the top of the washing plant. This elevator discharges at a rotary screen which scalps out rocks and niggerheads and passes to large 100 ton washers. These washers are really nothing more than square wooden bins, each of which has an adjustable spillway in one corner over which runs the water that has, by its movement through the sand, washed out the impurities. The adjustable spillgate consists of a series of small boards of uniform length which are built up one on the other in steel grooves.

From these washers the sand is picked up by two No. 5 Nye pumps, here illustrated, and sent to drain bins on the north side of the building. There are sixteen of these bins about 100 tons capacity each. These are also fitted with the same type of adjustable spillway as the wash bins.

After drying, the material is taken off at the bottom and passed to a 24-inch tunnel belt conveyor which is set, by a transmission cone, to run at the speed that is required by the dryers. The reason for providing for variable speed in this belt lies in the fact that there is considerable variation in the moisture content of the batches of sand. If the sand is wet, it is kept in the dryers for a greater length of time and the dryer is operated under higher steam pressure. Under more favorable conditions the dryer may carry 40 to 50 pounds of steam and operate more rapidly. These dryers were made by the Louisville Drying Machine Company of Louisville, Kentucky. They are powered by 45 h.p. motors each. The principle on which they are operated requires the passing of steam through a large number of flues running the full length of the dryer. As the dryer keeps turning over the sand is continually falling through the spaces between these flues and is quite effectively dried. Each dryer has a capacity of 25 to 30 tons per hour.

The method of filling these drain bins is one of the features of the plant. The discharge line from the Nye pumps has a flexible section at the point where it enters the floor from which the washer bins are filled. At the pump side of this flexible section the discharge line is stationary. The other side of the flexible section is a continuation of the discharge line some 15 feet long terminating in a section of pipe pointing downward and connected to the discharge line at right angles. The overhead track system permits the swinging of this discharge line over any pair of bins, to which the line is clamped. When one set of bins is filled, it is a comparatively easy matter to swing the discharge line to another point from which it will fill one of two other bins, depending upon the position of a flop gate which is set on the wall between the two bins.

The sand from the dryers is discharged on an 18-inch belt conveyor which feeds to a bucket elevator running to dry sand bins of 150 tons capacity each.

At the present time the company is doing no grinding. It contemplates the building of a grinding plant in the near future. They are now selling only one grade of the washed product, in which all the natural grain sizes are mixed. Seventy-five per cent of this material will pass a 20 to 30 mesh screen. A Hum-mer screen has been installed for grading and when this is put in operation the company's products will be a little more diversified.

Provision is made on the loading track for spouting the sand into cars direct from the drain bins. Each of these bins holds enough to fill one

gondola. As shown on one of the illustrations, these spouts are very widely constructed and the gates through which they take material from the bins are quite large. Cars are moved slowly past these wide spouts by cable and friction hoist. By the time the end of the car is reached, the bin has been emptied and the car filled. The material from the dryer sand bins is passed to papered box cars through flexible metal spouts which are put in at the doors of the cars.

The plant is powered by 2 Frost boilers of 150 horsepower each and operating at 140 to 145 pounds pressure. The "kicker" doors used on these boilers are shown in one of the illustrations. These doors make it possible, when using the overhead stoking system, which drops coal inside the door, to "kick" the fuel further back into the firebox. The gates used on the boilers were manufactured by the National Stoker Co. of Indianapolis, Ind. Water is furnished by a Fairbanks-Morse and a Worthington pump.

Most of the machinery in the plant is run from electric motors operating on the current furnished by 2 Allis-Chalmers dynamos direct connected to Allis-Chalmers turbines. Current is supplied at 220 volts, 60 cycles. An amount is transformed to 110 volts for the lighting circuits. Each piece of equipment has individual motor drive. General Electric motors are used throughout. The switchboard was manufactured by the Wagner Electric Co.

An air line is run to the plant for blowing dust out of the motors and other equipment. This line is supplied by a Westinghouse compressor, from which are also run the air hammers employed around the pit.

The "crude belt," as the pit run sand conveyor is called about the plant, is powered by a 50 horsepower Buckeye steam engine which also runs the car mover hoist near the drain bins. A 65 horsepower Ball engine is used for pulling the large cleat elevator which brings the sand to the washing and drying plant.

One of the accompanying illustrations shows the reservoir used to collect water for the boilers, and for the large pit at times when the supply obtained by seepage is less than is required for the successful operation of the sand pumps.

The Crescent Silica Company contemplates extensive improvements and additions in the near future. The bin space will be considerably augmented by extending the buildings now containing the dry sand bins, the 75-foot tower in the building intended for the grinding plant will be increased to 139 feet to allow the sand to go through a complete grinding and screening operation in its passage from top to bottom.

Coal deposits at Buffalo Rock, some 7 miles away, on the company's land are being developed. A Northwest crane will do most of the work, as the coal occurs close to the surface and is covered by a comparatively light overburden. The crane is equipped with a scraper bucket and can, when so equipped, handle both stripping and excavating. When the coal is taken out, it will be shipped by truck to the plant.

The Western Washed Sand & Gravel Co., Milwaukee, Wisconsin, has been incorporated with a capital of $25,000. Incorporator: Frank Schub, 1065 Second St., Milwaukee, Wisc.

The Attica gravel pit, owned and operated by the Carmichael Construction Co., of Danville, Ill., closed down on September 9th, following the issuing of orders by the Interstate Commerce Commission regarding the loading of coal cars.

Lime Association Meets in Chicago

Discusses Ways and Means to Help Sale of Lime

ON September 20 and 21 members of the National Lime Association held a special convention at the Hotel Sherman, Chicago, to discuss ways and means of giving additional force to the progressive movements that are now going on within the association. The chief concern of those who attended the meeting was to increase the demand for lime in the construction and agricultural business. For a number of years the use of lime in the chemical industries has been steadily advancing, much more steadily than its use in construction and agriculture. Many of the member companies depend to a large extent on these latter markets and the association can do itself a great deal of good by stimulating the demand for lime in other than chemical fields.

A number of tentative plans along these lines were proposed at the Cleveland convention last June, and since that time Mr. W. R. Phillips, General Manager of the National Lime Association, has been to all sections of the country and discussed the details of the proposed plan with groups of lime manufacturers. This trip, extending over some 10,000 miles, gave Mr. Phillips valuable material on the attitude of members and non-members of the association toward the enlarged plan for promotional work.

The special convention just held in Chicago was for the purpose of extending discussion on the details of the needs of the lime industry as a whole in the various sections, and to ratify plans proposed up to this time and tentatively adopted.

The idea of a considerably enlarged budget for educational research and promotional purposes gained the unanimous support of the convention. The method of operating, of course, will vary somewhat in various sections of the country and will be influenced largely by purely local needs and conditions. The proposed activities cover in a general way an amount of investigational work, the development of new products, and the promotion of lime and its various uses through extensive and intensive field work.

One of the chief items of business at the Chicago meeting was discussion on the reorganization of the National Lime Association along territorial lines. An apportionment of all the states in the Union into three divisions was proposed and adopted. Each division will be in charge of a district manager, who will direct development work in his own territory under the supervision of the general manager of the association. The general manager will be in charge of all the association work, with an enlarged technical staff devoted to construction, chemical and agricultural research work. In this way it is believed that the consuming public will come to a better knowledge of the importance of lime in the fields in which it finds application.

The association will maintain a laboratory service for the free use of lime consumers in working out their problems, improving their products, and in finding new uses for these products.

The district manager plan will go into effect about October 1st, at which time announcement will be made of the names of the men who will head the new activities of the Lime Association in various sections of the country.

Storage and Transportation of Portland Cement

BY W. M. MYERS
Assistant mineral technologist, U. S. Bureau of Mines.

THE U. S. Bureau of Mines conducted an investigation to determine the cause of the deterioration of Portland cement during storage and transportation, and to discover a means of preventing it. All available printed sources of information on this subject have been examined and a bibliography has been compiled. The subject has also been discussed with the leaders in the cement industry; the present report is the result of their cooperation, and is based principally on information thus obtained.

Deterioration of Portland cement during storage over any considerable period of time has long been noted; closely related to it is deterioration of cement during transportation, which involves not only the time factor of storage but also exposure of varied climatic conditions. Deterioration in both cases is due to hydration of the cement by absorption of moisture from a humid atmosphere, or by exposure to actual rain-fall. After hydration cement possesses no cohesive power; the degree of deterioration is directly proportional to the degree of hydration.

The amount of deterioration of Portland cement during storage has been accurately determined in an investigation by the Structural Materials Research Laboratory, in cooperation with the Portland Cement Association. Cement stored in a shed in cloth sacks retained 80 per cent of its original strength after three months storage; 71 per cent six months; 61 per cent after one year; and 40 per cent after two years.

The deterioration of Portland cement during storage and transportation was noted particularly in France during the World War. Information concerning cement used by the American Expeditionary Forces was furnished by Lt. Col. H. S. Spackman and Major E. C. Eckel, U. S. R., who had charge of practically all matters concerning cement used by the A. E. F.

The cement used by the A. E. F. came from the following sources: 42,000 tons was French, Swiss, and Spanish cements; 120,000 tons was English cement 55,000 tons made in plants operated by the A. E. F.; 500 tons (not over) from America. Deterioration was most marked in cement from the first source.

The climatic conditions in France are very severe for finished Portland cement, owing to the long rainy season and the accompanying high humidity. Cement stored for a period of two months was sometimes almost worthless. Cement was not always stored where it could be reached easily, and some storehouses were emptied in the reverse order of filling, so that the material stored first was the last to be removed; some cement, therefore, was unavoidably stored longer than it could withstand the climate.

The deleterious effect of the climates of France on Portland cement is constant. It is not dependent on unusual conditions, as is recognized by French manufacturers, who endeavor to send their product direct to the point of consumption immediately after grinding. The specifications of the French Government for the storage of cement are strict, as may be seen from the following résumé:

1. Cement must be stored in an air-tight room.
2. Cement must be covered with tarpaulin.
3. Cement must not be stored nearer than 18 inches to the wall.

Some English cement used in France was damaged further as a result of the English custom of shipping it in 200-pound bags; these heavy bags are difficult to handle, and are torn by the hooks of the stevedores, thus exposing the cement directly to atmospheric conditions.

The quality of the little American cement used was satisfactory.

In the United States, Portland cement is shipped in barrels, in cloth or paper bags, or in bulk in cars. Cement for export is generally packed in barrels. The superiority of American packing over European barreled cements has been noted by commercial agents of the United States in South America.

The use of air-tight containers for storing and shipping Portland cement would obviously prevent deterioration, but the prohibitive cost of such containers would greatly outweigh the benefits derived from their use. Two feasible improvements have been suggested that would not only improve the quality of the cement, but would also effect appreciable economy in transportation: (1) Storage and transportation of the cement in bulk; (2) Storage and transportation of the cement in the form of unground clinker, and grinding the clinker at destination.

Deterioration of cement stored in bulk is less than in bags, owing to the smaller area exposed. Hydration takes place only at the exposed surface, and the bulk of the cement is unaffected. Cement transported in bulk must be shipped in a tight, closed car, and must be protected from moisture during loading, shipping, and unloading, preferably it should be used immediately after unloading at the point of destination. This practice is now followed by several manufacturers and where conditions are suitable it is becoming more common as its advantages are seen. Shipping in bulk effects a saving by eliminating the use of bags—which is an important item in the cost of cement and it should also permit a saving in freight rates.

Clinker, the fused product of the cement kiln before it is ground to form the finished Portland cement, is exceptionally well adapted for transportation or storage over long periods of time under adverse conditions. It is extremely inert and has no tendency to absorb moisture. Experiments show that clinker may be stored under water, or subjected to alternate dry and wet storage, without lowering the quality of the finished cement.

This cement has two distinct advantages: The quality of the cement produced from stored clinker is higher, and the grinding cost of the clinker is decreased because of mechanical disintegration.

The improvement in the quality of cement made from stored clinker is due to the hydration of any free lime, (CaO) that may be present. Free lime is injurious to the finished cement, as it produces unsoundness. It is not present in a perfectly burned clinker, but it is present occasionally as a result of imperfect mixing of raw materials and of careless manipulation. Cement manufacturers, therefore, generally store clinker for several weeks or months before grinding. Clinker that produced unsound cement in one instance was found to yield a satisfactory product after being treated with steam to hydrate the free lime.

Though Portland cement in the form of clinker is most carelessly handled and stored without regard to humidity or climatic conditions, yet improvement rather than deterioration of quality is manifest in the ground product.

The mechanical disintegration of clinker during storage makes grinding easier, thus somewhat increasing the capacity of the mills and decreasing the cost.

Clinker, like iron ore, can be handled in bulk in large quantities. Barges or steamers can be loaded cheaply and heavy expense of using bags for the finished Portland cement may be entirely eliminated. Freight rates on clinker shipped in bulk should be lower than the rate for bagged cement, hence an appreciable saving could probably be made on this item. It would not of course be practical to ship clinker short distances to points near the source, as all demands for cement could be supplied directly from the manufacturer, the elements of transportation and storage being unimportant.

The feasibility of operating a grinding plant in connection with any cement project depends on several factors, the following of which are the most important:

1. The cost of erecting the plant. This cost would vary according to the location, and with the cost and transportation of machinery and supplies.
2. Operating cost of plant, depending among other things, on the amount and type of power and labor available.
3. Loss in possible subsequent scrapping of plant.
4. Amount of cement used and possibility of continued demand.
5. Economies to be realized in transporting clinker to mill, as against loss in material by transporting the ground cement.
6. Difference in freight transportation for clinker and for finished cement.
7. Saving by eliminating the use of bags.

The actual expense of installing a grinding plant would probably not be less than $10,000 under the most favorable circumstances, so that it would be impracticable to grind clinker for any project using less than 30,000 or 40,000 barrels of cement.

The transportation of Portland cement in the form of clinker could be applied to any large construction project situated at a distance from the nearest cement mill in the United States; it could be applied also to a foreign market. To warrant the installation of a grinding plant in such a market, it would be necessary that the market should be located favorably with regard to cheap transportation; that it be a large consuming or distributing point; and that there be no competition from local manufacturers. Exceptionally humid climate, or other conditions injurious to finished Portland cement, would be an added inducement. In a number of South American ports these conditions exist. One cement manufacturer 12 years ago made extensive plans to ship clinker to Cuba and grind it there, apparently did not attempt to carry out his plans.

A prominent engineering company of New York is now engaged in a large construction project in Brazil, and is installing a clinker mill at Ceara, composed of two units having a capacity of 500 barrels per day. It is planned to ship Portland cement in the form of clinker and grind it at destination. The results obtained will be of great value not only as to relative costs of shipping bag cement as against clinker, as to other economies involved, but also as to the general feasibility of the whole project.

The Buffalo Crushed Stone Co., Buffalo, N. Y., has increased its capital stock from $20,000 to $100,000.

A blast of 55 tons of dynamite was set off recently by the Blue Diamond Materials Co., of Corona, Calif. A portion of the Blue Diamond mountain, as large as a city block, was brought down and is now being scooped out by steam shovels. The company was eleven months preparing for this blast.

Solving the Accident Problem in the Cement Industry

A Paper Given Before the National Safety Congress

By J. CUTHBERT

Assistant Superintendent, Canada Cement Company, Ltd., Port Colborne, Ont.

In June, 1921, our company decided to make a special effort to try to reduce our accidents and July was selected to start our campaign for a "No-Accident Month." I will admit that we had very little experience in accident prevention work, so that we may claim to have started from the very bottom of the ladder; in fact, No. 8 had the worst record of any of the plants of the Canada Cement Company.

There was no tangible reason why our record should have been so bad as the conditions in this plant were no more dangerous than any of the others. We were making guards all the time and we were posting the National Safety Council bulletins, but I must admit that we were only doing so as a matter of routine and were not putting any personal touch into the matter. When we had an accident the foreman had to give an account of it, but we could not understand why we were so unfortunate and had such a bad accident record.

Nothing in the way of trying to arouse enthusiasm for accident prevention had been attempted—we were paying more attention to production and building up mechanical features than we were to the human condition of the plant. Our record was as follows:

Period.	No. of Lost Time Accidents	No. of Minor Accidents	Total No. of Accidents	Total Lost Time (days)
Year 1920	48	22	70	906
First 6 mos. 1921...	47	25	72	500

We had our first organization meeting June 17, 1921. A central committee, composed of superintendent, assistant superintendent, the foreman of the machine shop and the foreman of repairs, was appointed. The objects of the campaign were fully explained and the full co-operation of all the foremen solicited.

Our next step was to analyze all the accidents from 1920 to date, both by departments and cause, giving the name of the injured man, his injury, the date, the cause and foreman's name. This data was given to each member to digest and at the following meeting a general discussion was had. It was soon discovered that only one accident out of the entire number could have been prevented by the installing of a guard. Everything indicated that our campaign would of necessity be one of education. A suggestion box was installed and, as is the usual case with all campaigns, the replies received consisted largely of advocating the placing of a guard here, changing a platform there, putting on a new roof, getting new chain blocks and similar matters. In order to cope with some of this work four men were detailed to the making of guards, etc., so that we might prove to the average workman that we were sincere in our efforts to prevent accidents.

We held meetings every week and discussions on plant conditions were invited, the members being encouraged to speak freely without fear of offending the superintendent, assistant superintendent, the foremen or the men. In this way a good many

unsafe places and dangerous practices were brought to light. In order to get everyone talking and thinking safety, homemade bulletins, in addition to those of the National Safety Council, were used and new bulletin boards were made and installed in the most conspicuous places around the plant.

The plant was thoroughly inspected and as many of the dangerous places as could be discovered at the time were carefully noted. The work of rectifying these hazards was carefully planned and systematically carried out. The foreman of each department was encouraged to go ahead and make up guards, using the operating and repair men at their disposal at times when they were not rushed along other lines, and in this way a great deal of very useful work was accomplished.

The record for July, August and September, 1921 (the first three months of our campaign), shows that we were not making the desired progress in our accident-prevention work. During these three months we had: Lost time accidents, 12; no-lost time accidents, 10; a total of 22. Days lost, 245.

We were not satisfied; we were not getting results. Numerous guards were being made, but we were not arousing enthusiasm in the average man—we were only reaching the foreman; so we decided to try another plan. The plant was divided into sections, each foreman having a committee of his own, he to be its chairman. Weekly meetings of these committees were arranged and a meeting of all the committees was held every two weeks. The total number serving on the safety committee was thereby increased from sixteen to fifty. Our idea was that if you could get the man interested, get his confidence, get him to talk, you could very often explain away difficulties which in some cases existed only in his mind and you could also get ideas for overcoming of dangerous practices. If you do not encourage the man to express himself you do not learn of these things until an accident has happened or you meet him at some time when he is not expecting you.

I attended all of these small committee meetings to start them going—this was the beginning of October, 1921—giving a general talk and explaining our ideas to them; encouraging the men to show initiative and take a personal pride in the plant and its record. Each meeting lasted about thirty minutes.

It was not my intention to attend these small committee meetings after the first time, but to wait and see how the idea developed. I am sorry to say that by the end of the month the interest in them had fallen very low. Since I had proposed these meetings I was not going to see them fail because of lack of interest, so I planned to again attend each of them the following month. I attended four safety committee meetings the first four days of each week and also the combined committee meeting every second week. I did this and I concluded that although you may be an enthusiast in safety work, the interest of the man could not be kept alive in the work through this method.

It was then decided to hold a combined safety meeting every week, which was to be attended by all committees, and each foreman could have a meeting of his committee whenever he so desired. At the same time we were running a cleanliness campaign, and another idea was tried out in an attempt to make these meetings as interesting and attractive as possible. Each foreman was asked to visit some department other than his own and to make a written report on the conditions he found there, both as to cleanliness and safety; also to offer

suggestions he thought would make for better working conditions. These reports were handed to me before the weekly meeting, but the name of the foreman making a report on another's department was never divulged.

The interest aroused through this method was a wonderful help, both from a cleanliness and a safety standpoint. If a foreman was reported because of some material not being cleaned up or put away into its proper place, he would be censured by his fellow foremen, and you can rest assured that the same thing would not be reported very often. This scheme worked well for nearly six months.

In the month of October, 1921—the fourth month of the campaign—we had two or three cases of infection, which ran our lost time up rather high. In November we built a new first-aid room close to the office and employed a registered nurse. There is not the slightest doubt that the good work of the nurse had much to do with the success we attained after this date. The month of November was really a "no-accident" month, but owing to the wrong dating of a report of an accident, which happened on Dec. 2 (the case of a boy cutting his finger in the bag shed and losing four days), we were not credited as we should have been. During December the plant was closed down for extensive repairs and alterations and we really expected to have some trouble, in spite of the hard work which had been done to guard against possible accidents. We had only one case, that of a man slipping on a scaffold four feet from the ground and slightly spraining his left arm, losing one day. The total accidents for October, November and December were:

Lost time, 8; no-lost time, 3; a total of 11. Days lost, 181.

It was very encouraging to start off the year 1922 with a clean sheet and everyone resolved to do all in his power to keep up the good work. It is a long lane that has no turning and we thought that now we were on the road to success. Some of the old school who were skeptical about accidents being preventable by education were changing their minds. They were taking more care with the new man, teaching him how to do his work, explaining to him what he should do and what he should not do and showing him the safest and easiest way.

More ideas for homemade bulletins were coming in. In the machine shop the foreman made a simple but very ingenious device to assist in giving publicity to the good work. The machine is a revolving drum, with bulletins attached to it running slowly with enough of a bulletin exposed so that a person could read it easily. The interest aroused by this method was effective, and as the need for new and original bulletins became greater our next job was to supply the deficiency. We had a young man working in the tool crib and stores department nights who lost his right leg while employed by one of the telephone companies. He was a safety enthusiast and on being asked how he would like to assist in our educational work he was only too pleased to have an opportunity to save some other chap from being as unfortunate as he.

We had a copy of the National Safety Council's slogans and this very useful little book was good foundation for our work. After selecting the slogans, and reprinting them on large bulletins, they gradually suggested other good material and in the end he had a large amount of good local matter to work with. The interest aroused by this method was a great help and in the course of two or three months we had more of the men in the plant interested in the work and some very good local bulletins were posted. From January 1 to June 30 of this year (1922), our record was as

follows: Lost-time accidents, 11; no-lost time accidents, 6; a total of 17. Days lost, 145.

Considering that five of these accidents happened on the same day, and that two were fatal, we had every reason to feel very optimistic. (The accident referred to occurred while cleaning out a water tank.) We went through the month of February without a lost-time accident and April was a "no-accident" month—not even a minor accident requiring a doctor. From March 16 to May 20, sixty-four days, we did not have a single accident.

We have a system whereby, when a department goes one month without an accident, it receives a star, if it goes three months it receives one red star, and if it goes six months it receives two red stars and so on. In conjunction with this system of stars for "no-accident months" by departments, each is penalized for accidents according to the number of men, the hazard, etc. The interest aroused by this method is very keen. The system was introduced in May of this year and made retroactive to January 1.

A specific case is that of a teamster who received a broken leg. He was under the jurisdiction of the yard foreman and engaged in cleaning up the yard. On the day of the accident he was sent to the ballground, and while on his way back the accident happened. The yard foreman thought that as he was doing something for a common sport that all departments should help to bear the loss, so after considerable discussion all departments agreed to share in the loss and to give him his star.

Another case was more difficult to decide. An oiler in the kilnroom, in pulling a switch, had his face burned and was off fourteen days. In this case the kilnroom foreman claimed it was an electrical accident and that it should not be charged against the kiln building; the electrical department claimed that he was a kilnroom man, that he regularly performed this duty, and they had no direct control over him. The outcome was that the departments agreed to share the loss, but the electrical department claimed that if they were to be partly responsible for accidents to departmental men that this increased their hazard and that their penalty in points should be lowered. This was agreed to.

Our whole campaign has been so conducted as to keep all the workers interested. We have succeeded to a certain extent, as shown by the following results:

	Man Hours 100,000	Accidents	Accident Frequency
January to June, 1921..	4.60	51	11.1
July to December, 1921.	4.24	20	4.7
January to June, 1922..	3.87	11	2.84

While our accident record was improving our plant was becoming cleaner and our production increasing; indeed I may claim that this has been our banner year.

The Fish & Eddy Sand & Gravel Co., Arverne, N. Y., has been incorporated with a capital of $30,000. Incorporators: J. Fendrick, M. Weiss, H. D. Swartz.

The ouster suit, which the attorney-general of Kansas has been waging against the cement companies of that state, was settled recently whereby the cement companies instead of being penalized will pay into the school fund of the state $25,000; to Z. T. Hazen, state commissioner, $4,000; and to pay the cost of the case. The court has issued a decree enjoining the companies from continuing or maintaining a trust, from making any contracts binding themselves to sell or deliver cement at a standard price, from establishing a selling price, and from preventing a free and unrestricted competition among themselves and others in the sale of cement in Kansas.

Crushed Stone Plant with Unequalled Railroad Facilities

(Continued from page 63)

electricity is used exclusively for power. Current is received at 23,000 volts from the Interurban line and transformed to 440 volts. General Electric transformers and power boards are used. All motors are 3-phase and running on ball bearings. They were supplied by the Fairbanks-Morse Company, who also furnished the motor starters. Power house work was done under the direct supervision of Mr. Nichols, who is an electrical engineer with considerable experience in power plant installation.

After cars have dropped down by gravity to the bins and been filled, they are made up into trains by a 60-ton Schenectady switching locomotive which hauls them to any one of the four railroads intersecting the company's right-of-way.

In connection with the plant of the Lake Shore Stone Products Company is an up-to-date machine shop, which includes lathe, shaper, planer and power drilling and forging equipment. It is the intention of the management to add considerable more equipment later, so as to be able to take care of practically all repairs right on the ground.

Even in its present incomplete condition, the plant is turning out a good quantity of stone. Ninety thousand tons are blasted and ready for crushing. Two 10-hour shifts are working in the quarry and at plant construction and the company has contracts at profitable prices for all the crushed stone it can produce during 1922. The dust created by the crusher is in demand by the various cement plants in the vicinity, and the very small stone is absorbed by Chicago mail-order houses who dispose of it as chicken grit. In fact, the company's largest revenue per ton comes from the sale of dust and grit.

The company maintains an office at Sandusky, and has its main office in Cleveland. Mr. Joseph Hobart, Jr., of Cleveland, Ohio, president of the City Land and Mortgage Company of Cleveland, is president of the concern. The vice-president is Mr. Warren S. Stone, also of Cleveland. The secretary and treasurer is Mr. John E. Giedeman of Sandusky, Ohio, president of the American Banking and Trust Company of Sandusky.

Effects of Breathing Carbon Dioxide

Experiments on the effects of breathing carbon dioxide have been conducted at the Pittsburgh, Pa., station of the United States Bureau of Mines under the direction of Dr. R. R. Sayers, Chief Surgeon of the bureau, and A. C. Fieldner, supervising chemist. About 2 per cent of carbon dioxide in oxygen produced a slight increase in lung ventilation but no subjective symptoms; 5 per cent in oxygen caused an increase in lung ventilation of about 100 per cent, but no other signs or symptoms; 7.2 per cent produced about 200 per cent increase in lung ventilation, and moderate perspiration and a slight fulness in the head were experienced after breathing the mixture for 10 minutes; 9 to 10 per cent produced about 300 per cent increase in lung ventilation, and the subject complained of frontal headache and was dizzy and perspiring at the end of 10 minutes. About 9 per cent of carbon dioxide in oxygen was breathed by some of the subjects for as long as 45 minutes, but the breathing was very laborious, and dizziness, headache, and perspiration were marked. In fact, to have done any work while breathing this mixture would have been extremely difficult.

The Leicester Lime Corp., Brandon, Vt., has been incorporated with a capital of $100,000. Incorporators: A. F. Moriglioni. West Rutland, Vt., L. Bandilloni, Center Rutland, Vt., and W. R. Shattuck of Pepperill, Mass.

Ask Better Service

Producers Oppose Priority Before Interstate Commerce Commission.

By Our Washington Correspondent

Declaring that priority order No. 25, issued September 19, and made effective September 21, by the Interstate Commerce Commission although it superseded priority order No. 23, did not offer the relief sought, representatives of the National Association of Sand and Gravel producers appeared before the Interstate Commerce Commission Thursday, September 21, and asked for a further modification of priority orders which would give to their industry sufficient open top cars to fill orders on hand and to meet the demand for their products.

The association was represented by President Alex Dann and a committee consisting of E. Guy Sutton, former executive secretary of the Association; J. M. Chandler, of Oklahoma; G. C. Ross, of West Virginia; H. B. Springer, of Chattanooga; W. L. Smith, of Memphis and V. O. Johnstone, of Lincoln, Ill. Each of these men argued before the commissioners and in addition an argument was made by W. C. Markham, who represented the Association of State Highway Officials and who, on this occasion, represented unofficially the Bureau of Public Roads.

The priority order issued by the commission, and effective September 21, covers preferential shipments eastward from the Mississippi, permitting the use of open top cars after the discharge of coal carried in them for transportation of road and building construction materials. In other words, producers of sand and gravel and other road and building materials may be permitted to use open top cars on their return trips to the mines. It was held in the arguments before the commission that this modification is not wholly satisfactory, and the commission was asked for a more equitable distribution of cars and cancellation of the reconsignment privilege and that affective steps be taken to prevent accumulation of back loads and empties at both points of origin and destination.

A plea against priority orders generally was made by the speakers. The entire proceeding was conducted by President Dann and the members of the committee, there being no legal talent participating. Mr. Sutton was chairman of the committee which prepared the appeal to the commission and the plan of procedure.

Incidentally it might be stated that the issuance of the priority order of September 19 solves to a greater or lesser extent the problem of the National Crushed Stone Association of which W. Scott Eames is president. Mr. Eames held a brief conference on Monday, September 11, with Secretary Hoover of the Department of Commerce, in an effort to have priority order No. 23 modified. But now that the commission has modified the order the crushed stone producers will have the same privileges in the use of open top cars as the order gives to sand and gravel producers and to the industries connected with road and building materials. In all probability the crushed stone producers will back the sand and gravel producers in the appeal for an equitable distribution of cars and for cancellation of the reconsignment privilege.

At the hearing representatives of the sand and gravel producers based their arguments on the petition which the association had filed with the commission. This petition pointed out the inability of producers to get cars and the evil resulting therefrom, and asked the commission to distribute open top cars on an equal basis to all shippers requiring such cars for transportation of their materials, and that coal cars be available in the transportation of sand, gravel and stone in the direction of the mine or mines on the return trip. This appeal in the petition is granted in the priority order effective September 21.

Mr. Markham argued before the commission along a different line. As representative of the Association of State Highway Officials and as unofficially representing the Bureau of Public Roads, he pointed out the difficulty which states are having in obtaining road building materials and dwelt upon the value of good roads as a relief to transportation congestion, citing several instances where motor trucks have taken tremendous burdens off of the railroads. In this connection Mr. Markham said:

"We have been urged repeatedly by Federal officials to eliminate non-employment by advancing a large road

building program and yet it seems that we are repeatedly confronted at this season of the year with other Federal requirements which bring to naught the program outlined. Is it not time that the Federal Government should cease flitting from flower to flower jumping only for the honey when the flower will no longer exist if there is no one to water it? 'Shortage of transportation' is the cry heard on every hand and it needs no argument to those who are abreast with the times to prove to them that highway transportation is today a vital arm to the nation's everyday necessities."

Mr. Markham explained that on July 8, 1920, Thomas H. MacDonald, chief of the Bureau of Roads, in a similar hearing appeared before the commission concerning this same subject, and at that time quoted from the remarks of the Secretary of Agriculture made on March 1, 1919, who in turn quoted the President of the United States, as desiring the states to further their road building program not only as a public necessity but also to furnish employment to idle labor, and added:

"We have every season since that time tried to carry out that suggestion, being urged on also by the Secretary of Commerce. Surely no further evidence is needed to show that the Federal Government has been active in urging a large building program. But our experience has been very disheartening, and it seems to us that all arms of the Federal Government should, therefore, make every effort to cooperate in this very important public function. We do not believe it to be within our province to attempt to instruct this commission on what relief measures to take. However, when it is well known that some states mine no coal and ship in all their road building material, the order of September 21, wherein cars can only be used on their way to the mines, it is clearly evident that these states might as well be provinces of Canada."

The Silverdale Gravel Co., Arkansas City, Kansas, has been incorporated with 2,400 shares non-par value stock.

The Standard Gypsum Company, San Francisco, Calif., has been incorporated with a capital stock of $500,000. Directors: Martin Uldall, W. C. Riddell, H. H. Winner, Martin Bruton and C. O. Greever.

New Beaumont Crushers

The recent announcement of the purchase of the Beaumont Road Machinery department by H. J. Kaltenthaler of Philadelphia has aroused considerable interest in the contracting, quarry operating and road building fields, particularly when it was learned that the purchaser intended making several improvements upon the Beaumont Crusher before placing it on the market.

Several of these newly designed crushers have recently been placed in operation by the new manufacturer, H. J. Kaltenthaler.

Among other things the Beaumont crusher is now furnished with replacable bushings.

The castings in which these bushings are placed, are accurately bored taper and the bushing turned taper on the outside, so that the bushing when placed in the castings fits the hole accurately. These bushings are inexpensive to replace as compared to the time consumed in the old method of pouring babbitt; and then still meeting the question of proper alignment. These bushings eliminate this expensive operation and insure accurate alignment at all times.

This scheme of advantage to the user has been followed all through this line of crushers. There is an interchangeability of parts in this machine that places it foremost in crusher design and workmanship. The replaceable bushings will fit in any part of the machine where the same size bushing is used, either on right or left hand side of machine. This appeals greatly to the users of crushers, as it reduces the carrying of spare parts to a minimum and reduces the time and expense when making repairs.

Plans are under way for the construction of a cement plant in the vicinity of Kaying City, China. Descriptive matter and proposals for the cement making machinery are desired. These should be addressed to Chin Wen San, care of Messrs. Tek Hua Seng, Chaochowfu, via Swatow, China. Communications may be in English but all correspondence with Mr. Ching Wen San must be in Chinese. This may be handled through representatives in China located in Swatow, Canton or Hongkong, although this district could possibly be reached through Shanghai.

Cement Mill News

Activities of Many Plants Chronicled by Our Special Correspondent

The July record of the Lehigh Valley cement district of Pennsylvania of having practically every mill in operation on a capacity basis, and this, incidentally for the first time in several years, would likely have been duplicated in August, September and later months of the year but for the all-important consideration of fuel. Depleted coal supply and not very encouraging aspects for immediate replenishing of stocks, have gone to mar the situation, with the result that curtailment has been necessary at a number of the mills.

Neglecting the coal situation, conditions and prospects in the industry are as bright as they have been for some time past. The demand has maintained at high point, giving every indication that 1922 would be a banner year for the mills; distribution has been equally good, and it stands much to the credit of the plants and the railroads that excellent dispatch of stocks, and reversely, the handling of empty cars, have prevailed throughout the spring and summer in the Lehigh section.

But very few of the manufacturers have been able to create any sizable reserve, and with the fuel situation rapidly heading towards actual coal shortage, the necessitated let-up will be felt keenly in this district. Every effort is being made to secure bituminous coal, and in some quarters, with a fair degree of success, at least to the extent of permitting continuous operation now. Labor conditions hold good; there is a sufficient supply of men, and those available, on the other hand, have had no difficulty in securing employment. Wage scales remain the same, as set forth at the time of the recent increase in PIT AND QUARRY.

The mill base price has advanced to $2.00 a barrel in carload lots in the Lehigh Valley section, and considering the situation as outlined, there is rather sure indication of further increase as the fall season progresses. Another 5 to 10 cents a barrel is the prevailing opinion.

The Giant Portland Cement Co. has been the first to feel the pinch of coal shortage, and both the Central mill of the company at Coplay, and the Reliance mill at Egypt were forced to shut down on this account recently. Fortunately, the company has been able to secure a fair supply of fuel, and operations have again been placed under way at the last noted plant.

The Lehigh Portland Cement Co., Allentown, Pa., has been operating under heavy output at its different mills in this district, and the large tonnage leaving the plants during July has been fairly equalled through the month of August. Following the development of capacity production at the three New Castle plants of the company, as mentioned in the last issue of PIT AND QUARRY, employes at the mills have seen fit to bring about a curtailment through an unreasonable wage demand, totaling approximately 25 per cent. The laborers at the mills declared a strike, enforcing idleness in a number of departments. The company has so far refused to accede to the demands. Other plants of the company are being continued at capacity, and the fuel supply is said to be in fairly good shape.

Following a strike of about a week's duration, the company compromised by granting an increase of 20 per cent, effective September 1, the action being brought about to a large extent by the similar wage increase of the United States Steel Corporation. This plant, as well as the other mills of the company, are now running full, and the fuel supply is said to be in fairly good shape.

The Atlas Portland Cement Co., Northampton, is running under good daily schedule at its local mills. Orders continue to pile up at the plant, and the heavy current shipments do not seem to be entirely sufficient for the demand. With the fuel supply holding up, this company will maintain its maximum plant operations for practically an indefinite period.

The Pennsylvania Cement Co., Bath, is operating at a high point of production at its local mill, giving employment to a large working force. It is expected to hold to this schedule of operation for many weeks to come, and orders being received insure this condition, providing that the working situation remains favorable.

The Bath Portland Cement Co., is running at an encouraging status at its Bath, Pa., plant, with every indication of continuance at the present

time. A regular working force is being employed. The company has entered suit against the Hudson Cement & Supply Co., Baltimore, Md., for $25,000, for cement alleged to have been sold to this company over a period of years but for which payment has not been received.

Howard Rhode, advertising manager for the Lehigh Portland Cement Co., gave an interesting address recently before a meeting of the Square Club, Hotel Allen, Allentown, Pa., on the subject of the "Manufacturing and Marketing of Cement." The talk was illustrated with a number of interesting lantern slides. It traced the origin of the material back to the day of the Romans, explaining how the present Portland cement was discovered by an accidental experiment in England. He commented upon the great value of uniformity in production and the need for the chemist to bring this about.

Mill prices have advanced in practically all of the cement producing districts, with some increases ranging as high as 25 to 30 cents a barrel over the previous levels. At Leeds, Ala., a rate of $2.10 has been established, as compared with a former base of $1.85; an advance of $1.95 has been made at Steelton, Minn.; at Hannibal, Mo., the price has increased from $1.85 to $2.00 a barrel. Producers at Universal, Pa., have fixed the local mill base at $2.00, while a new rate of $2.35 has been placed into effect at Fordwick, Va.; a similar rate prevails at Mitchell, Ind., and at Mason City, Ia. The mills at Iola, Kan., are quoting at $2.10 a barrel, while at Buffington, Ind., a $1.95 level is well established. The mill base at Hudson, N. Y., was advanced late in August to $2.10, and remains at this figure.

The Security Cement & Lime Co., Baltimore, Md., is planning for enlargements in its plant at Hagerstown, Md., for large increase in production. Facilities and equipment will be provided to advance the output close to 50 per cent over the present run. It is expected to commence work at an early date.

The Lehigh Portland Cement Co. has been forced to curtail production at its plant at Mitchell, Ind., owing to coal shortage. A number of departments have been shut down for an indefinite period, throwing several hundred men out of employment.

The Egyptian Portland Cement Co., Fenton, Mich., has leased a portion of the former steel car works of the Grand Trunk Railroad at Port Huron, Mich., for a term of years. The new owner plans for the immediate establishment of a new cement mill, and will remodel the different existing buildings to accommodate this line of production. Machinery and equipment will be installed at the earliest date, and it is expected to have the new mill ready for service early in the coming year.

The National Portland Cement Co., Mount Pleasant, Mich., has perfected plans for the immediate erection of the initial units of its proposed cement mill at Coldwater, Mich. The plant will consist of a number of buildings, with power house, machine shop, and other mechanical departments, and is estimated to cost close to $500,000, including equipment. A. E. Gorham is president.

The State Railroad Commission, Texas, has recently established a rate of 30½ cents per 100 pounds on cement, minimum weight 34,000 pounds per car, from Harrys and Eagle Pass to stations on the Chicago, Rock Island & Gulf Railroad, Soney to Glen Rio, Tex., inclusive.

Small Vertical Air Compressors

The Ingersoll-Rand Company, 11 Broadway, New York, announces a new line of small vertical belt driven air compressors known as Type Fifteen. In addition to the plain belt drive design each size is built as a self-contained electric motor outfit, driven through pinion and internal gears, or by employing the short belt drive arrangement. The compressing end and electric motor of both gear and short belt drive units are furnished mounted on a common sub-base, so that they are in no way dependent upon the foundation for correct alignment.

Several noteworthy features of construction have been incorporated, of which the "constant-level" lubrication system is the most important. Others include the constant speed unloader for plain belt drive machines; the centrifugal unloader for start and stop control machines; and the increased size of the water reservoir cooling pot.

A descriptive bulletin has been issued on these compressors which describes in detail all their features including others not mentioned above.

Prices Hold Strong

Much Encouragement In General News of Eastern Territory

By Our Eastern Correspondent

Business holds brisk in the sand, gravel and crushed stone markets at New York and vicinity. The threatened scarcity of basic construction materials of all kinds has given impetus to the situation, with the result that both factors, buyer and seller, are showing a keen aptitude to make the most of the favorable conditions as they stand today. As to be expected, price quotations are strong, with decided inclination to trend upward in a number of instances.

The coal situation is uppermost in mind; the growing scarcity in fuel means a curtailment in production in many quarters, with corresponding decrease in construction and building activities of all kinds. The effect of the railroad strike, such as it has been has been more imaginary than real, throwing possible car idleness and shortage, with rail congestion, in the foreground, to act as a barrier to the development of anticipated projects in the construction and affiliated industries. Again, the labor situation is far from satisfactory, and the continual eagerness of workers in the trade to make a bid for higher wage scales is having a demoralizing effect in undermining the desired industrial stability. Pick and shovel men at New York are now receiving 60 cents an hour, while unorganized laborers are getting 45 to 50 cents.

Sand and gravel production is keeping up well, and quite in accord with current demand. Sand pits and stone quarries in New England, Northern New York, New Jersey and Pennsylvania, are showing no fear, in the wide majority, of any lag in call, and where possible are running on a basis that will allow for reasonable reserves by the time the winter season sets in. Building supply dealers continue to absorb fairly heavy quantities of materials, and are holding up their stocks in good fashion.

The prices of primary materials in the industry hold uniformly firm to levels established several months ago, and if anything, will move upwards in the fall, when other important commodities exhibit their anticipated advance. Selected gravel is quoted at $1.75 a cubic yard in the wholesale market for standard ¾ and 1½-inch sizes; a price of $2.75 prevails for such stocks delivered on the job in the Manhattan districts. A year ago, a figure of $3.25 to $3.50, retail, was current.

Good quality sand holds to the $1.00 a yard level in carload lots to contractors and dealers. Building supply yards are quoting the stock at $2.00 delivered, while clean, white, sharp sand is $4.50, on the job. The Long Island producers are sending sizable quantities of material into the market.

Crushed stone, f.o.b. cars, New York, in carload lots, continues to be priced at $1.65 a cubic yard for 1½-inch material, and $1.75 for ¾-inch. A number of sales recently have been recorded at slightly higher levels, but such deals carry no standardization as regards prices. In the local retail market, crushed stone is quoted at $4.00, delivered.

Cement has advanced to $2.30 a barrel at New York in cargo lots, f.o.b. cars without bags. The necessity for mill curtailment on account of fuel shortage has had the effect of not only increasing the price, but to bring a decided stiffening in quotations, and a still further advance is not unexpected. Delivered by truck, wholesale, a price of $2.60 a barrel is asked; with customary bag rebate of 10 cents each, dealers are asking from $3.25 to $3.45 for the better grade cement, delivered.

Common hydrated lime shows an advance from $12.50 to $13.10 a ton, wholesale, at the warehouse; finishing hydrate is quoted from $15.80 to slightly over $16 a ton. Hydrate common in paper, is $19.50 per ton in retail quarters, while hydrated finishing lime is $24.00 a ton, retail. Common lump lime is from $2.75 to $3.15 a barrel at the warehouse, while finishing lump material is at $3.64 a barrel. Finishing lime in standard 300-pound barrel at New York, retail, is $4.50, while common lime, same size barrel is $3.75 at the supply yards.

The large sand plant of the Goodwin-Gallagher Sand & Gravel Corporation, New York, at Port Washington, L. I., has been temporarily closed down, pending the installation of equipment to prevent the pollution of the water of Hempstead Harbor. The action has been taken in co-operation with the War Department, which has

been investigating the situation as a result of complaints of the taxpayers' associations of this district. It is planned to resume production at the earliest possible moment. The company is one of the largest shippers of sand and gravel to the New York market, and has been using about 100 scows from the Port Washington plant, as well as a number of motor trucks. Employment has been given to about 300 men at this works.

The Mallet Sand & Supply Co., New York, has been formed under state laws with a capital of $10,000, to operate a sand and gravel business. The company is headed by M. K. Knorhel, I. E. Riessick and E. T. Hiscox. It is represented by Donnelly & Kadel, 2804 Third Avenue, New York.

The Associated Sand & Transport Co., Rochester, N. Y., has been formed with a nominal capital of $5,000, to operate a sand and gravel business. The company is headed by A. D. and C. M. Weller, and L. Brotsch, all of Rochester. It is represented by C. E. Bostwick, Rochester.

The Lautz Marble Co., 861 Main Street, Buffalo, N. Y., will commence the immediate erection of a new one-story plant, 110x142 ft., with office structure adjoining. Itt will be equipped as a general marble works, for cutting, grinding, polishing, etc., and is estimated to cost about $125,000, including machinery. The Turner Construction Co., 242 Madison Avenue, New York, has the general building contract.

The Monson-Maine Slate Co., Monson, Me., has resumed operations at its local quarry, following a three-week curtailment, due to a strike of pitmen, numbering about 40 in all. The dispute had to do with wage scale and working conditions, and a settlement has been effected by the company.

The Booth Brothers Co. and the Hurricane Island Granite Co., Rockland, Me., have arranged a satisfactory settlement with the quarrymen employed at their plants at Long Cove, St. George, Me., following differences and necessary curtailment of operations. The new agreement is for a three-year period. Negotiations are under way for a similar equitable settlement of the strike now on at the plants in the Wildcat district, St. George.

Granite manufacturers at Quincy, Mass., have entered into agreement with their cutters, who have been out on strike since April 1 last, for a 44-hour week and minimum wage scale of $1.00 an hour. The working schedule and wages are those in force previous to the strike, which was brought about by the announcement of the three local plants that wages would be reduced 20 per cent. The men have now returned to the plants and operations have been resumed.

The Town Committee, Newton, N. J., which has been furnishing crushed stone to the county from its plant on the Newton-Andover Road, has agreed to a reduction in price from $1.75 to $1.60, on the basis of crushed run. In a hearing on the matter, it was brought out that a close estimate of current cost to the town is about $1.00 a ton at the crushing plant.

The trap rock stone quarry of the F. J. Marley Co., on the summit of the Second Watchung Mountain, Bloomfield Avenue, Montclair, N. J., at which operations were discontinued a number of years ago, is now being permanently abandoned, and all buildings, crusher supports, etc., are being removed. Hundreds of thousands of tons of cracked stone were taken from the plant during the period of production, and utilized largely as road ballast.

The Star Sand Co., Pittsburgh, Pa., has been organized under Delaware laws with capital of $25,000, to operate a sand and gravel business. The company is headed by C. E. Frankenberry, Philip Kussart, Pittsburgh; and T. J. Chantler, Beaver, Pa. It is represented by the Capital Trust of Delaware, Dover, Del.

The Benner Slate Co., Danielsville, Pa., operating the local quarry of the Montgomery Slate Co., under lease, is developing a heavy capacity, giving employment to a normal working force. The monthly average of finished production is 1,000 squares of roofing slate, and close to 80,000 school slates.

The McClain Sand Co., Point Marion, Pa., has been formed under state laws with a capital of $250,000, to operate local sand and gravel properties. F. L. Bowers, Point Marion, is treasurer.

The Albion Vein slate quarry, Pen Argyl, Pa., has effected a compromise with workers at the plant in their recent demand for an advance of 25 cents per square of slate. The men have accepted an increase of 15 cents, as offered by the company.

These Are the Car Service Orders Now in Force

Service Order No. 24

At a Session of the Interstate Commerce Commission, Division 5, held at its office in Washington, D. C., on the 30th day of August, A. D. 1922.

It appearing, In the opinion of the Commission that an emergency which requires immediate action exists upon the lines of each and all the common carriers by railroad subject to the Interstate Commerce Act, west of the Mississippi River, and because of the inability of said common carriers properly and completely to serve the public in the transportation of essential commodities. *It is ordered and directed:*

"1. That each such common carrier by railroad, to the extent that it is currently unable promptly to transport all freight traffic offered to it for movement, or to be moved over its line or lines of railway shall give preference and priority to the movement of each of the following commodities: Food for human consumption, feed for live stock, live stock, perishable products, mine supplies, medicines, fertilizers, seeds, newsprint paper, coal, coke and other fuel and petroleum and its products in tank cars." (Change made effective midnight, September 20, 1922).

2. That to the extent any such common carrier by railroad is unable, under the existing interchange and car service rules, to return cars to its connections promptly, it shall give preference and priority in the movement, exchange, interchange and return of empty cars intended to be used for the transportation of the commodities specially designated in paragraph numbered 1 hereof.

3. That all rules, regulations and practices of said common carriers by railroad with respect to car service as that term is defined in said act are hereby suspended so far as they conflict with the directions hereby made.

4. That this order shall be effective from and after September 1, 1922, and shall remain in force until the further order of the Commission.

5. That copies of this order be served upon the carriers hereinbefore described, and that notice of this order be given to the general public by depositing a copy hereof in the Secretary of the Commission at Washington, D. C.

By the Commission, Division 5:
(SEAL)

GEORGE B. McGINTY,
Secretary.

Service Order No. 25

At a Session of the Interstate Commerce Commission, Division 5, held at its office in Washington, D. C., on the 19th day of September, A. D. 1922.

It appearing, In the opinion of the commission that an emergency which requires immediate action exists upon the lines of each and all the common carriers by railroad subject to the Interstate Commerce Act, east of the Mississippi River, including the west bank crossings thereof, and because of the inability of said common carriers properly and completely to serve the public in the transportation of essential commodities, *It is ordered and directed,* that effective September 21, 1922, and until the further order of the commission:

1. That each such common carrier by railroad, to the extent that it is currently unable promptly to transport all freight traffic offered to it for movement, or to be moved over its line or lines of railway shall give preference and priority to the movement of each of the following commodities: food for human consumption, feed for live stock, live stock, perishable products, mine supplies, medicines, fertilizers, seeds, news print paper, coal, coke and other fuel, and petroleum and its products in tank cars.

2. That to the extent any such common carrier by railroad is unable under the existing interchange and car service rules, to return cars to its connections promptly, it shall give preference and priority in the movement, exchange, interchange and return of empty cars intended to be used for the transportation of the commodities specially designated in paragraph numbered 1 hereof.

3. That any and all such common carriers by railroad which serve coal mines whether located upon the line or lines of any such railroad or customarily dependent upon it for car supply, herein termed coal-loading carriers, be, and they are hereby, authorized and directed whenever unable to supply all uses in full, to furnish such coal mines with open top cars suitable for the loading and transportation of coal, in preference to any other use, supply, or distribution of such cars; provided, that the phrase "open top cars suitable for the loading and transportation of coal" as used in this order shall not include or embrace flat (fixed) bottom gondola cars with sides 42 inches or less in height, inside measurement, or cars equipped with racks, or cars which, on July 1, 1922, had been definitely retired from service for the transportation of coal and stenciled or tagged for other service.

4. That all such common carriers by railroad other than coal-loading carriers, herein termed non-coal-loading carriers, be, and they are hereby, authorized and directed to deliver daily to a connecting coal-loading carrier or carriers, or to an intermediate non-coal-loading carrier for delivery through the usual channels to a coal-loading carrier, or carriers, empty coal cars up to the maximum ability of each such non-coal-loading carrier to make such deliveries and of each such connecting coal-loading carrier to receive and use the coal cars so delivered for the preferential purposes herein set forth.

5. That all such common carriers by railroad be, and they are hereby, authorized and directed to discontinue the use of open top cars suitable for the loading and transportation of coal, for the transportation of commodities other than coal, so long as any coal mine remains to be served by it with such cars; and as to each non-coal-loading carrier, so long as deliveries of any such cars to connecting carriers may be due or remain to be performed under the terms of this order; provided, that such open-top cars suitable for the loading and transportation of coal, after the discharge of the coal lading thereof, may be used for the transporta-

tion of road and building construction materials, ore, mine supplies for current operation and fluxing stone for furnaces when the destination of such materials is in the direction of but not beyond the mine or mines to which such open-top cars are destined for coal loading, and when such use will not materially delay or minimize the production and transportation of coal; provided, further that an embargo be placed against the further placement of open-top cars for loading with such commodities for any shipper who shall fail or refuse to load the open-top cars within 24 hours after placement of such loading thereof.

6. That all such common carriers by railroad be, and they are hereby, authorized and directed to place an embargo against the receipt of coal or other freight transported in open top cars suitable for coal loading, by any consignee, and against the placement of such open top cars for consignment to any consignee, who shall fail or refuse to unload such coal or other freight so transported in coal cars and placed for unloading, within 24 hours after such placement, until all coal or other freight so transported in coal cars and so placed has been unloaded by such consignee and shall notify the commission of such action. This authorization and direction as to embargoes shall not interfere with the movement of coal to tidewater or the Great Lakes for transshipment by water, nor shall it apply where the failure of the consignee to unload is due directly to errors of disabilities of the railroad in delivering cars.

7. That in the supply of cars to mines upon the lines of any coal-loading carrier, such carrier is hereby authorized and directed, to place, furnish, and assign such coal mines with open-top cars suitable for the loading and transportation of coal for such special purposes as may from time to time be specially designated by the commission or its agent therefor by special priority direction in writing, in preference and priority to any other use; provided, that the open-top cars so placed, furnished, and assigned shall after loading be transported for the special purposes designated, and shall not be subject to reconsignment or diversion except by and with the approval of the commission.

For the more prompt and effectual administration during the present emergency of the authorizations, directions and requirements of this paragraph No. 7, the following persons are designated and appointed as agents of the commission, with authority to give directions as to car service and to the matters referred to in paragraphs (15) and (16) of section 1 of the interstate commerce act, and referred to in paragraph No. 7, viz.: John C. Roth, Director, E. H. DeGroot, Jr., Assistant Director, Frank C. Smith, Chief Inspector, and B. S. Robertson, Service Agent, of the Bureau of Service of the commission, and the directions so given by them shall be regarded as directions of the commission.

8. That all rules, regulations and practices of said common carriers by railroad with respect to car service as that term is defined in said act are hereby suspended so far as they conflict with the directions hereby made.

9. That Service Order No. 23 as amended, be, and the same is hereby, suspended and superseded, effective at midnight September 20, 1922.

10. That copies of this order be served upon the carriers hereinbefore described, and that notice of this order be given to the general public by depositing a copy hereof in the office of the Secretary of the commission at Washington, D. C.

By the Commission, division 5:

(SEAL) GEORGE E. McGINTY, Secretary.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trademark attorney, Continental Trust Building, Washington, D. C., at the rate of 20 cents each. State number of patent and name of inventor when ordering.

1,423,021. Screening apparatus. Morley P. Reynolds, Cleveland, Ohio, assignor to W. S. Taylor Co., same place.

1,423,370. Revolving shaker screen. Julius C. Ohlarik, Valhalla, N. Y., assignor to Robbins Conveying Belt Co.

1,424,113. Mining-machine. Edmund C. Morgan, Morgan Park, Ill.

1,424,114. Mining-machine. Edmund C. Morgan, Morgan Park, Ill.

1,424,188. Rock-drill. William A. Smith, Denver, Colo., assignor to Denver Rock Drill Mfg. Co., same place.

1,424,451. Combined sand and gravel screen. Orlando C. Crandall, Stanwood, Mich.

1,424,750. Excavator plowpoint. Clayton, O., Anglemeyer and Frank E. Perlberg, Racine, Wis.

1,424,792. Rock-crusher. Clemens W. Ackermann, Chicago, Ill., assignor to Frog Switch & Mfg. Co., Carlisle, Pa.

The Hercules Powder Company, of Wilmington, Delaware, have reduced its prices on high explosives and B blasting powder, this reduction becoming effective on September 18th.

The state railroad commission of Montana has ruled that gypsum is not a mineral, but a rock, and should, therefore, come under the same rate as gravel and crushed rock, instead of the Class E rate which is applied to minerals.

The plant of the Oklahoma Portland Cement Co., at Ada, Oklahoma, has been running night and day recently. This plant is one of the largest west of the Mississippi river, with a capacity of turning out 6,000 barrels a day.

Texas Is Hard Hit

Car Shortage Causing Delay of Work and Loss to Operators

By Our Dallas Correspondent

Gravel dealers in Texas have been extremely hard hit during the last few weeks by the lack of cars for loading sand and gravel. This shortage has resulted from the priorities order of the Interstate Commerce Commission, that directed that coal cars be returned to the mines and loaded with nothing but fuel until the existing fuel shortage had been met.

The shortage of cars has been especially hard on gravel dealers operating in and near Dallas. The extensive gravel beds along the Trinity River in Dallas and Tarrant counties are recognized as among the largest and best in the state, and numerous large companies have been working these beds. The shortage of cars has caused a complete shut-down in many of the pits, while others are operating at less than one-tenth their normal capacity. Many large gravel companies with orders for gravel and sand mounting into millions of dollars are unable to move a wheel on account of inability to make deliveries because there are no cars in which gravel can be loaded.

According to A. W. Clem, head of the Clem Gravel Company of Dallas, one of the largest operators in the Dallas district, the car shortage at this time is due directly to Order No. 24 of the Interstate Commerce Commission. Mr. Clem explained that the gravel industry has depended altogether on surplus of coal cars for moving sand and gravel, and the order has brought a complete shut-down at many of the pits from which deliveries were made only by rail, loading being done direct from the pits to cars by means of steam shovels or drag lines. There is no surplus in coal cars at this time, nor will there be for some time, according to Mr. Clem, as the shortage of coal in some industrial sections is so great that cars will not be released for use in transporting any commodity other than coal for several months. In the mean time many large sand and gravel companies will face conditions little short of bankruptcy.

The shortage of cars is being felt most keenly in and about Dallas by the Clem Gravel Company, the J. Fred Smith Company, Vilbig Bros., Trinity Gravel Company and Hunter Ferrell Contracting Company. These companies depended altogether on railway deliveries or operated only a few motor trucks or teams for making deliveries.

The contracting firms in Dallas are also feeling the effect of the car shortage, as many large contracts have been tied up indefinitely on account of the inability of the firms to get sand and gravel. The J. Fred Smith Company reports more than $2,000,000 worth of road and street paving and city sewer contracts on hand, and the company can not deliver a yard of gravel until the car shortage is relieved.

Dallas county is also suffering a great handicap on account of difficulty in getting road building materials for its highway construction program. The county is now at work on several concrete highways and also the Belt Line Highway which is to encircle the city just inside the county line, and gravel and sand are being used in large quantities in this construction work.

According to Jack Witt, county engineer, the county will have to shut down much of its construction work at once unless the gravel shortage is relieved. The county has a number of large motor trucks obtained from the War Department, but this fleet of trucks is altogether inadequate for hauling all the road building material needed, if haulage is to be made from the gravel pits and sand banks. The trucks have been employed in hauling from the nearest railway sidings, generally less than a mile, and have been kept busy. If the hauling must be done from the gravel pits, sometimes as far as ten or fifteen miles away, the trucks will prove altogether inadequate, according to Mr. Witt, and the county will have to curtail its construction program, shutting down work altogether on many jobs, until the car shortage is relieved.

Those gravel companies operating in Dallas and Fort Worth that maintain their own wagons and teams or motor trucks for making deliveries, are operating at full time, but these companies can care for but little of the business.

Since the car shortage has become acute there has been a hardening of sand and gravel prices, although the

advance has not been great. Gravel can still be had delivered on the job in small quantities for $4.00 to $5.00 a cubic yard, although it is impossible to get gravel in quantity. Prices are not being quoted f. o. b. cars for there are no cars and none is being delivered this way.

The Southern Marble and Stone Company of Yoakum, Texas, has elected officers and directors for the ensuing year as follows: William Green, president; Philip Welhausen, vice president and treasurer; E. C. Koerth, secretary and C. L. Moore, general manager. The directors are: William Green, Philip Welhausen, W. L. Burton, J. H. Smith, Louis Trautwein, and J. W. Cearley.

The Salina Gravel Company of Muskogee, Okla., has voted to increase its capital stock from $10,000 to $200,000. The company will acquire additional beds and greatly enlarge its operations at Muskogee, it is announced. The vast road-building program upon which this county is entering has increased the demand for gravel to such an extent that an enlarged company was needed if the demand was to be met.

The International Gypsum Co., Seattle, Wash., has been incorporated with a capital of $60,000. D. McMaster and J. T. Dixon.

The Los Angeles Rock and Gravel Company have recently purchased four acres at Twentieth & Alameda Sts., Los Angeles, and will shortly build a spur track to this site. Bunkers for loading cars, with a capacity of 10,000 tons, will also be erected. This company has also acquired the fee to 400 acres between Baldwin Park and El Monte, Cal., and plans are being made to erect a complete excavating, crushing and washing plant to have a daily capacity of 5,000 tons.

Mr. Geo. D. Van Sciver, president of the DeFrain Sand Co., is building a three-mile private railroad at a cost of $250,000, from his sand pits at Morrisville, Pa., to the Delaware river. The railroad will deliver the sand to the barges which can be towed down the river to Philadelphia, Camden, Chester, Wilmington, and other points. Saving of freight charges and quickness of delivery will make this a very profitable investment.

Hardship in Indiana

Car and Coal Shortage Producing Their Inevitable Effect

By Our Indianapolis Correspondent

A scarcity of open top cars is reported from many sections of Indiana and the famine is working a considerable hardship on the many road improvement projects which are yet unfinished. Members of the Indiana Highway Commission are getting really worried over the situation. Several projects are held up on account of inability to get crushed stone from the quarries because of lack of cars and sand and gravel men also are complaining because of lack of cars for shipping. The highway commission has appealed to the public service commission relative to more cars in view of the fact that thousands of farmers virtually are marooned on their farms because of the extensive program having torn up the roads surrounding them. The commission has attempted to show the railroads that cars being returned to the coal fields are suitable for gravel and crushed stone to road projects in those fields. The New York Central railroad in Indiana has annulled about eleven local trains out of Indianapolis that there may be more motive power for freight transportation.

The return of the Indiana coal miners to work means little of immediate benefit to the producing division of the trade in Indiana. Nor will it mean a great deal for at least another month. Mine operators in this state say it will be at least four weeks before normal production will be reached by their mines. Cave-ins during the five months the mines have been abandoned, necessary repairs to machinery and the like will make it impossible to hoist coal as it should be done before that time.

Rail officials of the state have promised that cars sufficient to take care of maximum production will be supplied, but the operators are extremely doubtful. They point to the fact that never yet have the railroads of the state accomplished this feat, even under the most auspicious circumstances, and now in their present predicament, operators say they will be

fortunate to work their mines three or four days a week.

Right now the trade's plants are suffering more than they have this summer. Even those plants which operate electrically are to feel the pinch in higher utility rates, for the chairman of the public service commission has given a warning to this effect. It is certain the first coal mined in Indiana will go to the state institutions and the public service corporations. The trade will have competition also in its demand from the retail dealers. Most of the dealers' bins are empty of domestic fuel and the fall demand has started. Operators here have not decided on a mine cost per ton, but it is generally conceded the price will be about $4. With freight rates and handling charges, the trade will pay about $5.50 to $7 a ton delivered. Alfred M. Ogle, president of the National Coal Association, with headquarters in Indianapolis, is confident that, while there will be no overabundance of coal for industries this winter, there will be no actual suffering and no plants will have to further curtail production or suspend operations.

The Indiana Highway Industries Association is the name of a new organization which has been formed for the purpose of "obtaining fair specifications and fair consideration from the State Highway Commission," and resolutions that have been adopted ask the modification of several points of the commission's policy. Brick and asphalt construction interests are interested in the new organization, the executive committee of which is made up of the following:

William F. Fisher, representing the oil asphalt industry; J. C. Kelly, representing the rock asphalt industry; J. A. McDonald, representing the lake asphalt industry, and Robert H. McKinley, representing the paving brick industry. Contractors are expected to select a representative on the board soon. The association was not formed with any thought of political embarrassment to the state administration, Mr. McKinley, secretary of the Indiana Paving Brick Manufacturers' Association, said. Nor does the association oppose the building of concrete highways, he said. He said the asphalt and brick construction interests desire only a square deal such as that they receive in other states, and in the recommendations of the United States bureau of public roads.

Judge Moll in superior court in Indianapolis has overruled the demurrers of two Bedford stone organizations and fifteen affiliated companies and individuals named as defendants in an anti-trust injunction suit brought by U. S. Lesh, attorney general of Indiana, last March. In the demurrers it was asserted by the defendants that the complaint did not present facts justifying the conclusion that they were attempting to destroy competition or restrain trade. The overruling of the demurrers means that the case will be brought to trial later. The court ordered the defendants to submit answers some time during September.

The new mill at Speed, Ind., being built at a cost of $500,000 by the Louisville Cement Company to take the place of the old mill destroyed by fire July 13 with a loss estimated at $300,000, is making good progress and will have a capacity of 2,500 barrels of cement, compared with 1,800 for the old mill. All machinery will be electrically driven.

Officials of the Indiana Quarries Company, of Bedford, Ind., are considering the reconstruction of their stone plant which was destroyed recently by fire. The loss was approximately $300,000. The new plant will be of brick, stone, steel and reinforced concrete. Plans have not been completed.

The Millwood White Sand Co., Jackson, Ohio, has been incorporated with a capital of $120,000.

Work is being started on the new gravel plant of Mr. R. H. Eastwood, Grayville, Ill. Construction has been delayed on this plant owing to the loss of several cars of lumber, which have only recently been located.

The Northwestern district office of the Traylor Engineering & Mfg. Company has been moved from 615 Mohawk Bldg., Spokane, Wash. to 815 Alaska Bldg., Seattle, Wash. Mr. W. H. Agens is district manager. This change in location was made because of the fact that it will be easier to reach the mining interests of the extreme northwestern United States, British Columbia and Alaska, from Seattle.

Louisville Doubles Trade

In Spite of Transportation and Other Troubles

By Our Louisville Correspondent

While building operations in Louisville are showing some signs of slowing down now, the year as a whole so far has been practically double last year, and even the late summer months the builders carried on at the rate of about a million dollars a month. This together with the program of street and alley construction has furnished a good run of local business for sand and gravel people and it has helped out considerably.

The main trouble in the latter part of the summer has been that of transportation. There is a very good carlot business in sand and gravel and it has been limited mainly by car troubles. Most of the coal cars have been reserved for handling coal and it has been quite a problem to keep enough cars coming to serve the carlot business. At that, however, a fairly good volume of business is being done and at this writing there is some easing in the tension of car supply which promises to make the business good through the fall.

Meantime the good roads work has continued and other contracts are being let or will be let soon. For example there are contracts for 75½ miles of state and federal highway construction to be let by the State Highway Commission at Frankfort, September 27. Also the Maintenance Department is inviting bids on a bridge over Rolling Fork in Marion County.

Recent reports to the Chicago Automobile Association showed that southern states have added forty million dollars to their highway improvement funds this summer. The showing of Kentucky in this report is that it has made improvements in its roads and has contracts under way estimated at $875,000.

In addition to the road work which is going along earnestly, another thing of interest especially to quarry and cement people, is reports that there is to be seven million dollars hydro-electric dam project undertaken on the Licking River near Falmouth, Ky. S. A. Tescher, an Indianapolis Engineer, has been making surveys and inspections, and it seems has obtained options on land, but it is not yet announced who it is behind the project.

We have just closed State Fair Week here, which brought a big crowd to town and helped stimulate a new interest in good roads work.

One of the exhibitors in the Merchants and Manufacturers Bldg., at the State Fair was the Ohio River Sand and Gravel Co., which had a well equipped booth.

Right near by one of the most elaborate booths of the Fair was that of the Louisville Cement Co., which showed a modern farm home and gave some interesting illustrations of how concrete can be more extensively used on the farm to advantage.

The E. T. Slider Co., report that they have had a good demand all summer and they have done a fair amount of carlot business though this has been hampered some with car restrictions and transportation troubles. At times they were not able to load coal cars at all except when routed to coal mining territory, but lately Mr. J. E. Lloyd, manager of the Louisville yards, said he noticed some easing in the restrictions on coal cars so he has a feeling that the transportation end may show a little improvement.

The Kosmos Cement Co. say that they have had quite a problem in the matter of coal supply lately and have had to curtail their operations and shut down part of their plant. Incidentally the higher cost of coal has added materially to the cost of cement.

Indirectly the coal shortage and the consequent high prices is resulting in some curtailment and closing down of building operations. The resultant increase in cost of material together with higher wages have caused contractors to figure higher so as to be safe and this has caused hesitancy and some abandoning of construction projects. So the coal shortage has perhaps done as much as anything else to curtail fall building projects.

Dr. Oliver Bowles, mineral technologist of the United States Bureau of Mines, is making a general study of the technology of limestone quarrying. Dr. Bowles recently visited a number of limestone quarries in Virginia and West Virginia for the purpose of making observations.

Regulations For Mining

Issued by Government to Control Various Minerals

Operating regulations to govern the methods of mining oil shale, phosphate, sodium, and potash on leased public lands of the United States have just been issued by the Bureau of Mines, which is intrusted with the supervision of such operations.

The regulations provide that it shall be the duty of the supervisor and district mining supervisors to visit from time to time leased lands where operations for the discovery or mining of oil shale, sodium, phosphate, or potash are conducted; to inspect and supervise such operations with a view to preventing waste of mineral products, or damage to formations or other mineral deposits; and to supervise operations and conditions for the promotion of the safety, health, and welfare of workmen. Supervisors will submit recommendations for safeguarding and protecting the lives and health of the employees, the property, the minerals, and the mineral-bearing formations.

The lessee shall prepare such maps as in the judgment of the mining supervisor are necessary to show the surface boundaries, improvements, and topography, and the geological conditions so far as determined from outcrops, drill holes, prospecting, or mining.

The underground and surface sanitary, welfare, and safety arrangements shall be in accordance with the recommendations of the United States Public Health Service and United States Bureau of Mines. All employees shall be afforded all possible protection to life and health. All mechanical equipment used for the transportation of men shall be of a safe design. Adequate shelter holes shall be made, guide rails or fences shall be erected, and warning signs posted at dangerous walks or passages; all moving parts of machinery or belts, when endangering employees or liable to result in injury, shall be adequately guarded. In the mining and milling or treating of the ores or mined products, the employees shall be adequately protected from injurious fumes, acids, dusts, and harmful or dangerous conditions. In mines where siliceous or other harmful dusts are formed, drills shall be of the water-injection type and sprays shall be used to wet down the dust.

Lessees shall maintain for each underground operation sufficient amount of ventilation for such men and animals as may be employed therein.

The lessee shall store, thaw, transport, issue, and use explosives only in the most approved manner and with due regard for the safety and welfare of the employees and protection of property.

Mining operations shall be conducted in a manner to yield the ultimate maximum recovery of the oil shale, phosphate, sodium, or potash, due regard being taken to protect with adequate pillars all shafts, main exists, and passageways, also all beds or mineral deposits overlying the deposit being worked that at a future date many be of economic importance.

The regulations also cover the subjects of fire protection, escape ways, electrical equipment, disposal of waste rock, the submission of core or test hole records, and the application of improved milling methods.

Copies of these operating regulations may be obtained from the Bureau of Mines, Washington, D. C.

Statistics compiled by the United States Bureau of Mines show that during the first half of the present year, 149,124,520 pounds of explosives have been sold for use in the United States, a decrease of 3.6 per cent below the corresponding period last year and 42.8 per cent below the first six months of 1920. Of this total, 45.4 per cent was for coal mining, 22.7 per cent was for other mining, 8.1 per cent was for railroad and other construction work, and 23.8 per cent was for miscellaneous work.

Fire of unknown origin destroyed the buildings and equipment of the Fred Hartung & Son stone quarry, Swan Road, Wauwatosa, Wis. The loss is estimated to be about $50,000.

The Union Chain & Manufacturing Co., have moved their plant from Seville, Ohio to Sandusky, Ohio. They are now on the main line of the New York Central Railroad. A new catalogue is being put out by this copany and will be mailed shortly to all customers and to those who have requested one.

Activities In Memphis

Good Business — New Warehouses — News Notes

By Our Memphis Correspondent

September activities in Memphis and vicinity on sand, gravel, etc., have been very active and with open weather the autumn season must certainly be fraught with big business. Some trouble in getting cars is reported by operators. The gravel and sand pits are frequently on branch lines, and in competition with the harvest crop movement have to bide their time. There is also considerable activity by river, some of the companies operating in Memphis having their own boats that ply the Mississippi river.

The Fischer Lime and Cement Company on Walnut street are pushing to completion their large warehouse addition at Memphis, part of which has been in use for sometime, but the front of the structure, dining room for employes and display rooms are being finished. Kaucher and Hodges are the contractors and E. L. Harrison, the architect. The warehouse covers practically an entire block on the Southern Railroad between Linden, Pontotoc and Walnut streets. The sand and gravel offices of the Greenville (Miss.) Stone and Gravel Company and the crushed stone business operated at Williford, Ark., is quartered in this building. The firm is filling many contracts in Memphis on buildings and street work.

John A. Denie's Sons Company have just moved from their location of half a century at 82 S. Front street to their new home which they erected at 373 Adams avenue along the Southern Railroad tracks at Memphis. The building is of hollow tile and stonecote, the front decorated with ornamental stonecote casting and the interior trimmed in moulding plaster of unique design. A section of the building is reserved for the display room. The Denie Company has always been very active in the wholesale in the wholesale lime, cement, sand and building material trade. These people were among the first distributors in Memphis of Portland cement and the first manufacturers of lime in this section of the country. They are now supplying material on the Catholic Club and numerous other large structures under erection in Memphis.

The Missouri Portland Cement Company U. and P. Blank Bldg., Memphis, Tenn., report brisk September trade in sand, gravel and other materials. Their river activities and yard activities in North Memphis are very considerable at this season.

The Allen Gravel Company Exchange Bldg., Memphis is active in the Mississippi Valley section with their Tishomingo gravel and are supplying material for numerous road contracts.

Good Construction Record

Contracts awarded in the 27 Northeastern States during August amounted to $322,007,000, according to the F. W. Dodge Company. This figure was 46% over that of August, 1921, and only 8% under that of July, 1922. That a seasonal decline has set in after four months of unprecedented activity and that the decline is so slight would seem to be a most wholesome indication for the remainder of the year.

The August figures brought the total for the year to date up to $2,362,872,000, which is not only the largest figure for the first 8 months of any year, but is greater by 7 million dollars than the total for the entire year 1921. Comparing this year with 1921 on the 8 months basis this year is 58% ahead.

The outstanding feature of the August statistical statement is the increase in industrial plant construction which amounted to $67,373,000 or 21% of the month's total. This is the largest monthly figure of this class since March, 1920. One project accounted for 35 millions of this large total, the by-product coke plant of the Carnegie Steel Company near Pittsburgh. Even omitting this large single project, the remaining amount is greater than any monthly total since November, 1920.

Residential building still maintains the lead in August, with $100,822,000 worth of contracts, or 31% of the total. Public works and utlities amounted to $49,825,000, or 15%; business buildings, $38,122,000, or 12%; and educational buildings, $32,055,000, or 10%.

Contemplated new work reported during the month amounted to $371,249,000.

The Trenton Lime Co., Remsem, N. Y., has increased its capital stock from $40,000 to $625,000.

Latest Portable Loader

Herewith is illustrated a new portable loader recently produced by the Jeffrey Manufacturing Company, Columbus, Ohio.

For the mounting of present day loaders a three-point suspension is almost universally used, keeping the machine more stable on rough and soft ground, the latest and most satisfactory arrangement being the substitution of a crawler or caterpillar mounting similar to that used on war tanks, but of a lighter construction and with a three-point support to the frame.

The buckets used on the Tanktred Loader are of very heavy malleable iron and are provided with steel cutting edge extending well around the ends of the buckets, which protects the buckets from wear and is itself renewable. The whole bucket is so designed that the digging edge has a cutting clearance at all points.

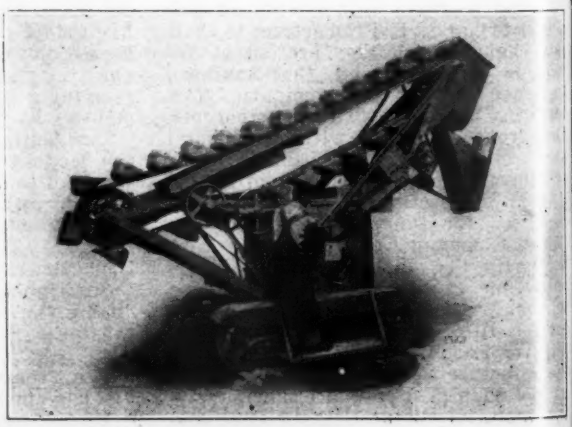
The whole foot of the elevator is so constructed that the buckets are wider than any other part, so that the whole machine can be advanced several feet into the pile with nothing but the clean cutting edge of the buckets coming in contact with the material and consequently will handle reasonably hard or frozen material even if it will not flow.

Another distinctive feature of this loader is a relatively large foot wheel, which, by reducing the centrifugal force, enables the buckets to pick up the material and especially the large lumps without kicking them away. A flexible wood boom keeps the buckets digging, but will spring enough to release the buckets from overload strain when they encounter a cave-in or such an obstruction as a railroad tie.

Two speeds, a traveling speed for moving the machine from place to place, and a feeding speed for driving the machine directly into the pile, give a wide flexibility of operation.

A universal swivel spout applied to the Jeffrey loader enables the operator to spot the material into various portions of the truck with very little change of position of either the truck or the loader and saves a great deal of time and manual labor in spreading the load. The truck may be driven in front of the loader equipped with this device and every position of the bed may be filled without moving the truck, even if the loader in the meantime had to change position.

In order to increase the capacity



of loading machines by keeping the elevator at work while a full truck is being pulled away and an empty one driven into place, storage hoppers have been developed, so arranged as to catch the discharge from the buckets and provided with a quick opening valve by means of which the contents of the hopper can be promptly discharged into truck. These hoppers are sometimes made with adjustable sides so as to correctly measure material for a batch for concrete mixing machines.

Slate Quarry Accidents

Four Killed and 385 Injured During the Year

Accidents at quarries throughout the United States producing slate in 1921 resulted in the death of 4 of the employees and the injury of 385, according to the Federal Bureau of Mines. The accident rates were 1.41 killed and 135.33 injured per 1,000 300-day men employed, as compared with 1.49 killed and 108.20 injured last year.

Reports from operating companies showed that 3,564 employees, who averaged 239 working days during the year, performed 853,496 days of labor. The number of employees indicates a gain of 68 men, but the length of the work year was 50 days shorter than in 1920; and the amount of work done represents an aggregate loss of 155,748 shifts. Employees of Pennsylvania slate quarries numbered 2,002; those in Vermont numbered 866; and those in Virginia 255.

Of the number of men working last year, 2,695 were employed in and about the quarry pits; they worked a total of 625,196 shifts, or 232 days per man. Three fatalities and 280 injuries occurred, resulting in rates of 1.44 killed and 134.36 injured per 1,000 300-day workers, as against 1.96 killed and 87.81 injured in the preceding year.

At the outside or rock-dressing plants 869 men were employed; they worked 228,300 shifts in all, averaging 263 days per man. One fatality and 105 injuries occurred, representing accident rates of 1.31 killed and 137.98 injured per 1,000 300-day workers, as compared with none killed and 172.20 injured in 1920.

Of the total of 3,564 men employed at the quarries and outside plants 2,840 men, or 79.7 per cent, were reported employed on the basis of nine hours per day.

Nonfatal accidents inside the quarries resulted mainly as follows: handling rock at face 57, falls of rock or overburden 31, flying objects 21, machinery 14, nails and splinters 14, and falling objects 12. Three men were killed by falls of rock or overburden. At the outside plants 36 men were injured by handling rock by hand, 14 by nails and splinters, 13 by machinery, and 8 by flying objects.

The total number of accidents reported were classified by the Bureau of Mines as follows: 4 fatal, 2 permanent total disability, 20 permanent partial disability, 70 temporary disability lasting more than 14 days, and 293 temporary disability lasting from 1 to 14 days.

Pulverizer Catalogue

A catalog on swing hammer pulverizers has just been issued by the Jeffrey Manufacturing Company, of Columbus, Ohio. This catalog is known as No. 368 and is devoted to swing hammer pulverizers of the following types.

Type "A" for general purposes.

Type "B" for break-down machines and fine grinding.

Type "D" for fine grinding of limestone and similar rock.

The catalog lists a large number of materials for which these pulverizers are suitable. In addition to the catalog illustrations and descriptions, there are also given a number of views of actual installations of these machines.

The McAlpin Hotel, New York, has recently included a number of books on cement and concrete in its industrial library.

J. C. Glenn, West Tulsa, Okla., is erecting a $25,000 sand plant on the west banks of the Arkansas River. Operation will be begun as soon as the machinery, which is on its way, is received.

The Atlas Engineering Company of Amherst, Ohio, has joined forces with the Kennedy-Van Saun Mfg. & Eng. Corporation of 120 Broadway, New York City.

Differential Utility Cars

Utility Cars

A type of car which can be used to advantage by many producers of pit and quarry products is manufactured by the Differential Steel Car Company, Findlay, Ohio, and is described in Bulletin No. D4 which is published by this company.

These are called differential utility cars and are specially designed to dump their load clear of the track. For this purpose the differential mechanism moves the body 3 feet to either side and balances it.

These cars are electrically moved and dumped. The bodies are divided into compartments so that three different kinds of materials can be handled at the same time, if desired.

Some of the cars are made with motors, while others are merely trailer cars to be attached to the motor car. They have a capacity of 18 cubic yards.

While they can be utilized in a great many places, their chief value will be where there is a long haul from the quarry or pit to the plant. There will also be many places where they can be used for delivering products, especially on street car or interurban trolley lines.

Sales of Permissible Explosives

Sales of permissible explosives reported to the Bureau of Mines in 1921 aggregated 41,133,851 pounds, and represent not only a reduction of nearly 13,000,000 pounds, or about 24 per cent below the preceding year's record, but also a lower quantity than was sold either in 1917 or 1918. Except for these three years, however, more permissibles were sold in 1921 than in any preceding year. They are fast replacing other high explosives and black blasting powder in coal-mining operations.

Of the total sales of permissibles in 1921, the mining industry consumed 94.7 per cent, as compared with 90.7 per cent in 1920. Coal mining consumed 38,055,650 pounds (92.5 per cent) and other mining used 881,710 pounds (2.1 per cent). Railroad and other construction work used only 262,545 pounds, or about six-tenths of 1 per cent.

Hoists

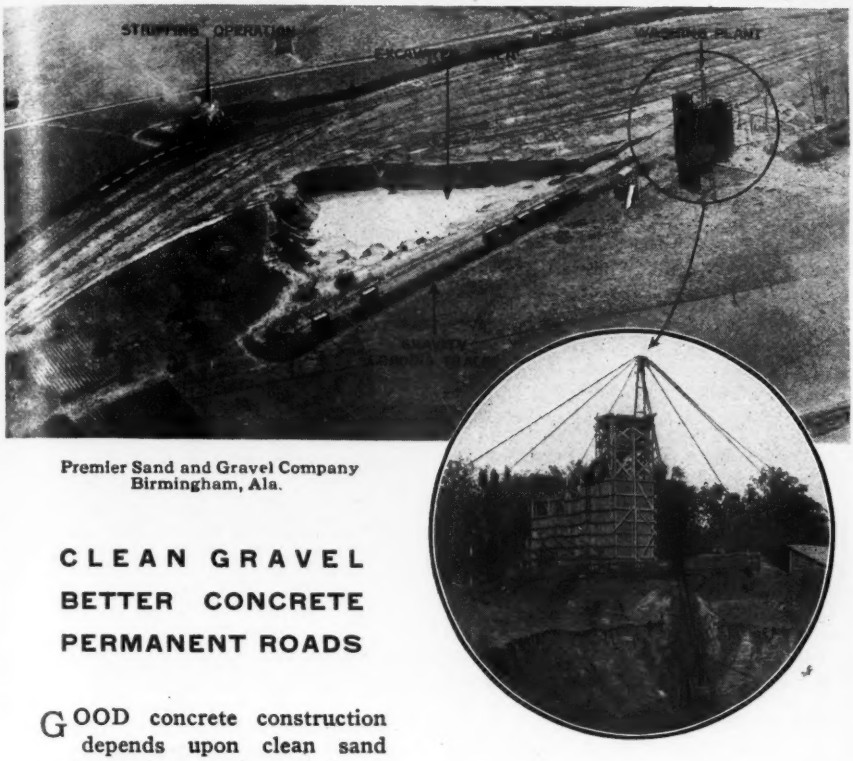
The Lidgerwood Mfg. Company, of New York, has just issued a special catalog on Lidgerwood two-speed hoists for slack line cable excavators.

These are particularly designed to stand a very severe usage on this work. They have a two-speed arrangement of gears giving very powerful line pull while the bucket is digging, and a high speed with light pull for a rapid return of the empty bucket.

They are all self-contained on a box form of bed plate, with specially designed frictions, ventilated break and friction flanges.

Some of these are designed with electric motors direct connected, others, for a belt drive, and still others for steam operation. In the case of these latter there is, of course, no necessity for a two-speed drum as the characteristics of the steam engine, with its ability to pull hard at slow speed and to speed up at reduced loads, give the necessary speed variations.

The Palmer-LaRue Sand & Gravel Co., Chagrin Falls, Ohio, has been incorporated with a capital of $5,000. Incorporators: C. B. Palmer, Norma B. Palmer, Charles P. LaRue and Nellie E. LaRue.



Premier Sand and Gravel Company
Birmingham, Ala.

CLEAN GRAVEL BETTER CONCRETE PERMANENT ROADS

GOOD concrete construction depends upon clean sand and gravel, properly graded, and free from vegetable matter and other foreign substances.

The airplane view above shows a modern plant for screening and washing sand and gravel.

A steam shovel strips the overburden and loads it into cars. The gravel is excavated with a dragline cableway bucket which dumps into a Link-Belt washing plant.

Three sizes of gravel and two sizes of sand are produced. The Pittsburgh Testing Laboratories report of concrete made from this product gives it a tensile strength of 137% and a compression test of 111%, which means good concrete and roads that are good when the bonds are retired.

Let our engineers figure with you on your problem.

0958

LINK-BELT COMPANY

Chicago—300 W. Pershing Road Philadelphia—Hunting Park Ave. & P. & R. Rwy.

LINK-BELT

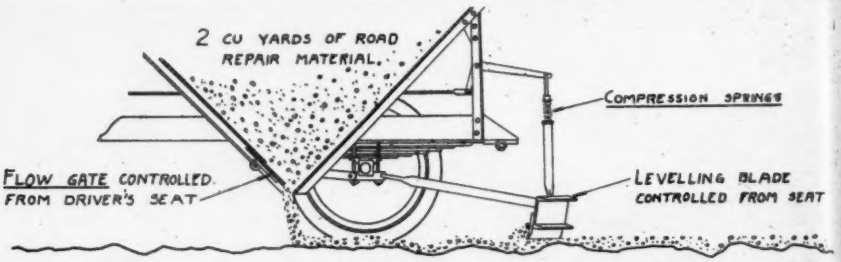

2 CU YARDS OF ROAD REPAIR MATERIAL
COMPRESSION SPRINGS
FLOW GATE CONTROLLED FROM DRIVER'S SEAT
LEVELLING BLADE CONTROLLED FROM SEAT

DIAGRAM SHOWING PRINCIPLE OF "PATROL" OPERATION

The "Patrol"

The "Patrol" is a highway maintenance truck manufactured by the Greenville Mfg. Co. of Greenville, Ohio. It is a product of the engineering department of the Greenville Gravel Company.

The truck holds two yards (3 tons) of gravel or any road repair material. It is constructed with a long narrow sliding gate extending entirely across the lower extremity of the front sloping side of the body. This gate can be opened 1, 2, 3, or up to 6 inches, creating a long slot which permits an even flow of material across the roadway of any thickness desired, the full width of the body.

An adjustable scraper or levelling blade, attached to the rear axle and also controlled from the driver's seat, further spreads the material and levels it over chuck holes, ruts, etc.

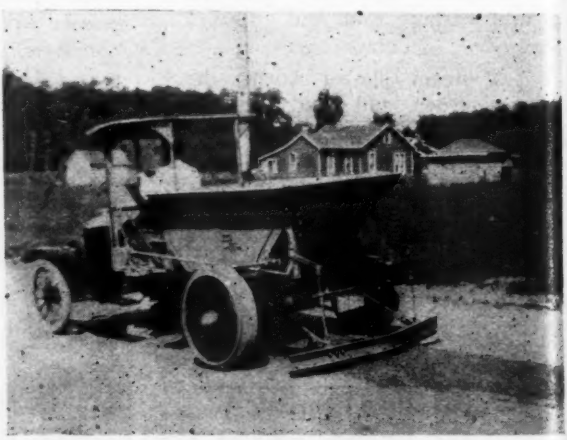
The sliding gate can be readily opened and closed, thereby giving the driver absolute control of the amount of material he is spreading. He can furthermore open one side at a time, permitting him to fill chuck and mud holes on either side of the road without spreading material over the balance of the surface in case none is required. It has also been used successfully as a power unit for pulling light road graders.

The machine travels at the rate of 12 to 15 miles per hour and has been found to equal the amount of hauling ordinarily requiring six teams and wagons. By virtue of the fact that it also spreads the material as it goes, thus further saving time and labor, it has proven to be the greatest money and labor-saving device which has been perfected in many years. It is being used on state highways, county roads, and city streets with equal success.

The "Patrol" is built on a standard Ford truck chassis. The front half is all Ford and the rear half is of 3½ ton truck construction with wheels, axle, springs, etc., to correspond.

The "Patrol" sells for $1,350.00 f. o. b. Greenville, Ohio. Such a price for a 3-ton truck will insure its universal use.

The Lehigh Portland Cement Company of Allentown, Pa., has recently acquired a tract of land containing an extensive limestone deposit, at Tarrant City near Birmingham, Alabama. The company proposes to erect a cement plant on this property, with a capacity of approximately 1,000,000 barrels per year.



The "Patrol"

Where Western Dump Cars "Make Good"

Carbon Limestone Quarry, Hillsville, Pa.

Stripping proceeds on the two upper levels in the above quarry—Western 4-yd. dump cars (narrow gauge) above; Western 12-yd. dump cars (standard gauge) below. Further down on the ground level are the quarry cars.

When those 4-yd. Westerns were substituted for the 5-yd. cars in use, they "increased production 50 per cent, due to the cars alone," according to the Superintendent.

Our new Catalog No. A-53 describes many successful installations throughout the country. A copy will be sent on request.

Western *That's Why*

Western Wheeled Scraper Company

Earth and Stone Handling Equipment,

Aurora, Illinois

Crusher Catalogue

The Austin Manufacturing Company, 400 N. Michigan Boulevard, Chicago, has recently issued Catalog No. 29 on Austin gyratory crushers and general rock crushing equipment, including elevators, conveyors, screens, etc.

One of the features of the catalog which will be studied with great interest is the section devoted to plans of a number of different types of rock crushing plants.

This company maintains an engineering department for the purpose of designing these plants, and also has a construction crew to take charge of the installation of equipment when desired.

The Pine Creek Lime & Stone Co., Jersey Shore, Pa., has been incorporated with a capital of $50,000.

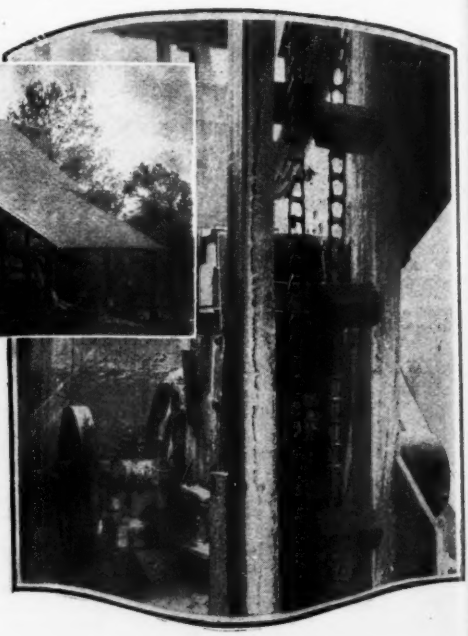
Mr. Chester J. Pegg, formerly assistant superintendent of the Tidewater Portland Cement Co., Union Bridge, Md., has been put in charge of the Limestone Products Corporation of America, Newton, N. J., in the capacity of General Superintendent.

Excavator and Loader

An illustrated folder on the Smith excavator and loader has just been published by The T. L. Smith Co. of Milwaukee. It features the fact that men who are using these machines for many kinds of work—drag line excavating, excavating sand and gravel, stripping, and miscellaneous handling—are saving considerable time and money. Illustrations show how contractors are able to keep their wagons out of the hole and how they eliminate the need for building and maintaining an incline. The new truck-type, four-cylinder motor of 4-inch bore and 5-inch stroke, now used, is also shown.

Following the action of the Trunk Line Association in New York on June 11, granting the request of the National Association of Sand and Gravel Producers for reduction in the minimum weights on sand, gravel and crushed stone, Central Freight Association lines have also approved a minimum weight on sand, gravel and stone to a basis of 90 per cent of marked capacity of car to apply between points in C. F. A. territory, effective October 1.

A Little Oil Now and Then



is the only attention Gruendler Crushers require.

This Limestone Plant is Gruendler designed and equipped. As is characteristic of all Gruendler Plants, it is equally efficient in crushing limestone for fertilizer or rock for roadwork.

WRITE FOR INFORMATION

GRUENDLER PATENT CRUSHER & PULVERIZER CO.
905 N. Main St., St. Louis, Mo.